NATIONAL BISON RANGE

NARRATIVE REPORT

January-December 1966

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Refuge Narrative Report

Calendar Year 1966

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UNITED STATES DEPARTMENT OF THE INTERIOR

Bureau of Sport Fisheries and Wildlife

Fish and Wildlife Service

Moiese, Montana

NATIONAL BISON RANGE

Refuge Narrative Report

Calendar Year 1966

PERMANENT PERSONNEL

Joseph P. Mazzoni, Refuge Manager
Frank L. Kenney, Refuge Manager (Ninepipe)
Melvin T. Nail, Assistant Refuge Manager (Trans. 8/29/66)
John G. Augsburger, Assistant Refuge Manager (EOD 9/6/66)
Victor B. May, Refuge Maintenance Foreman II
Grant Hogge, Heavy Duty Mechanic
Ernest W. Kraft, Maintenanceman III
Gladys C. Young, Clerk-Typist
Forest L. Largent, Maintenanceman I, WAE (Retired 12/30/66)
Edward G. Krantz, Maintenanceman I, WAE
Lee A. Hotchkiss, Student-Trainee

TEMPORARY PERSONNEL

James H. Putnam, Laborer
Robert E. Rogers, Laborer
Robert L. Middlemist, Laborer
Donna L. Crevar, Clerk-Steno, Intermittent
William H. Foust III, Summer Trainee (YOC)
Robert L. McVey, Laborer
Michael D. Priddy, Laborer
William L. Lampshire, Laborer
Grant J. Hovde, Maintenanceman I
Edmond G. Priddy, Maintenanceman I
Lester R. Winn, Laborer

TABLE OF CONTENTS

TABLE OF CONTENTS (Con't.)

NATIONAL BISON RANGE

Refuge Narrative Report

January 1 to December 31, 1966

I. GENERAL

A. Weather Conditions

The weather during the early portion of the year was generally quite mild with below average precipitation. The lowest temperature for the year was -12 degrees recorded on January 25. Snowfall during this period was light, with the greatest accumulation, 4.5 inches, recorded on January 24. Crusted snow was not a problem, and 1965-1966 wintering conditions for all big game species were excellent.

Spring and early summer moisture conditions were not conducive to good vegetative growth, and it soon became apparent that the summer and early fall period would be extremely dry without June precipitation. Desirable grass species made very poor growth, and began to mature two to three weeks earlier than normally. One notable exception was Kentucky bluegrass, a species which made excellent growth throughout the range.

May 29 brought light intermittent rains which continued through the end of June. A total of 3.16 inches of rain was recorded during that month, or 1.17 inches above the 15-year average. Although much of the grass had approached or reached maturity by this time, particularly on the south side of the range, the June rainfall was sufficient to avert the potentially serious drouth trend.

Total rainfall during the months of April through September was 7.19 inches, as compared to the 10.95 inches received in 1965, and the 15-year average of 7.70 inches, for the same period. Unlike the summer precipitation received in 1965, monthly rainfall was quite sporadic this year, contributing to alternate periods of extreme dryness and brief wet periods. As a result, depleted soil moisture reserves became worse as the season progressed. For example, during the excavations for the tour road rest-room facilities on May 25, we could detect no significant soil moisture at a depth of 7 feet. This was on a north slope at approximately 4,500 feet elevation. Normally stable spring flows were noticeably reduced in mid-August, and by mid-September at least two springs (one in the west fork and the other in the head of Elk Creek) had ceased flowing.

A storm on October 2 brought .8 inches of rainfall, and the first indication of the wettest October-December period since 1961. A total of 3.75 inches was received during this period, as compared to 2.74 inches in 1965 and the 15-year average of 2.74 inches. It was also one of the mildest and most pleasant fall and early winter periods in the memories of local residents. Most precipitation was in the form of rain and wet snow, with the greatest snow depth, 6 inches, recorded on November 8. The lowest recorded temperature was

9 degrees above zero on November 11. The first major storm of the fall period, on November 6 and 7, also triggered the first mass migrational movement of waterfowl observed in the Flathead Valley for several years, and largely contributed to the excellent waterfowl hunting conditions which followed. By the end of the year, only a light snow cover of about 2 inches in depth remained above the 3,200 foot elevation level.

Although the total annual precipitation of 12.53 inches was only .21 inches less than the 15-year average, the pattern in which it was received was not conducive to good growing conditions, nor to maintenance of soil moisture reserves. Hopefully, the ample precipitation received during the latter three months of the year was an indication of improved moisture conditions for the 1967 growing season.

B. Habitat Conditions

1. Water

This subject is generally covered in the earlier section. The amount of precipitation for the year was near average, but the pattern in which it was received was not conducive to optimum habitat conditions.

There were no major run-off periods, and the flows of Mission Creek, the Jocko River and other neighboring streams fluctuated only slightly during the year.

2. Food and Cover

Grass forage production generally was considered as below average. On some northern slopes where grass species had not yet matured at the time of the June rains, annual growth was good to excellent. Kentucky bluegrass, as indicated earlier, did exceptionally well in response to the late rains, and was a prominent species along stream courses and on good soil types at higher elevations.

Weather conditions appeared favorable to germination and growth of desirable grass seedlings, and seed production was considered excellent.

Browse species did not appear to be materially affected by the variable moisture conditions during the critical growing period, and made excellent growth. Production of western chokecherries, Prunus dimissa, and snowberries, Symphoricarpos occidentalis, was quite good throughout the range.

Since the advent of the various surplus animal disposal programs in the early 1950's, conifer reproduction has become quite successful. Dense, mixed stands of small Douglas fir and ponderosa pine are rapidly becoming established in open grassland areas in and adjacent to the timbered areas.

It is interesting to note that Montana's State flower, the delicate bitterroot, was blooming in profusion on Wild Horse Mesa

during the week of June 20th. They have never been more abundant than they were at that time.

II WILDLIFE

A. Migratory Birds

1. Waterfowl

Information on waterfowl populations, production and use in the general Flathead Valley area during the past year is included in the Ninepipe and Pablo Narrative Reports.

Waterfowl populations on the Bison Range during the summer months rarely exceeded 200 to 300 birds. Principal species were the mallard, widgeon, golden-eye, redhead, cinnamon and/or blue-winged teal, and a few common and hooded mergansers. Duck production appeared quite good, but not particularly significant in terms of total numbers of birds produced. One rather uncommon observation was a brood of 8 hooded mergansers on upper Mission Creek on June 7.

The summering population of Canada geese on Mission Creek near headquarters varied between 20 and 30 birds. The first brood, with 8 goslings, was seen on May 10 at the display pond. A later brood of 3 brought our total known goose production to 13 goslings for the year. We noted that two of our barrel nests near headquarters were deserted, with two eggs left in each nest. The drainage holes apparently became clogged with the dirt and vegetative nest material, and the nests became too damp.

The storm of November 6 and 7 brought the first waves of migrant snow geese over refuge headquarters on November 8. The wavey lines of over 500 of these birds etched the skies on that crisp fall day.

A count at the end of the year indicated 1,000 mallards, 45 green-winged teal, 40 golden-eye, 15 widgeons and 100 to 150 Canada geese were utilizing the streams of the Bison Range.

All waterfowl banding work was done on Ninepipe and Pablo this year, and is discussed in the Ninepipe narrative report.

2. Other Water Birds

Great blue herons appeared somewhat more abundant along Mission Creek. Four to five of these birds could frequently be observed along the creek during a two-hour horseback ride.

3. Shore Birds

The glacial formed Ravalli Ponds were again a popular concentration area for spotted sandpipers, the Wilson and northern phalaropes, and killdeer. Unusually large numbers of Wilson's snipe were noted in the upper Mission Creek bottoms on November 11. Fifteen to 20 of these birds were seen during a three-hour walk.

4. Mourning Doves

The Bison Range dove coo count route was discontinued following the 1965 count, with the establishment of new random routes in 1966. We are no longer involved in this annual project. Dove numbers did not approach the 300 to 400 population level of 1965. There were probably no more than 200 birds on the refuge at any one time this year.

B. Upland Game Birds

The ring-necked pheasant population remained relatively static throughout the Flathead Valley. Production was very poor, and low population levels persisted. It is doubtful that more than 50 birds used the refuge at any one time.

Gray partridges again experienced an excellent production year. Broods of 8 to 11 young were common. One brood with 14 chicks was observed on June 28. At the end of the year, the refuge population was estimated at approximately 400 birds.

The chukar partridge experienced the best production year since the severe winter losses of 1963. Several broods were observed on separate occasions in the lower Elk Creek and lower Trisky Creek canyons between June 30 and August 24, but it was difficult to determine how much duplication occurred in our observations. Broods with 15 chicks were seen in both drainages. We believe annual production was in the neighborhood of 40 to 50 birds, and have established a current population level of 75 birds.

Richardson's grouse also appeared to have had moderately good reproductive success. Four broods were observed, with a total of 17 chicks, or slightly over 4 chicks per brood. Although several broods are generally observed every year, the refuge population seems to remain fairly stable, at between 50 to 70 birds. Movement from the refuge as a result of the inherent mobility of the species and, perhaps, predation are probably the two major factors.

No ruffed grouse was observed on the refuge, although two were seen just east of the boundary on Post Creek on December 17. One bird was also seen near the refuge on the Jocko River during the period that this report was being prepared. According to our records, this species has never been particularly abundant on the Bison Range proper.

C. Big-game Animals

1. Buffalo

Despite the relatively unfavorable habitat conditions, the buffalo herd did quite well throughout the year, and the grazing approach used avoided the development of serious forage utilization problems.

Construction of the four miles of new division fence required for initiation of the deferred-rotation grazing program was not completed until August 25. Prior to initiation of this grazing system in

October, the herd was rotated within six of the existing seven pastures (including the Sheep Pasture). The object was to distribute grazing over the entire range, without subjecting any one pasture to more than light to moderate use. The period of grazing within each pasture was dependent upon forage availability and utilization.

Deferment of the Lower South Range was continued throughout the year, except during a brief period in late April and early May when a small herd worked their way in through the contour fence. This pasture has been subjected to excessive use during the past few years, and has been the poorest range area on the refuge. It has not been grazed, for all practical purposes, since the summer of 1965, and under the new deferred-rotation program, will not be grazed until October 1967. The initial results of deferment through 1966 were particularly gratifying, and illustrated the capacity of a rangeland area to recover from the effects of overgrazing, given protection, reasonably favorable growing conditions, and adequate remnant stands of desirable grass species. This range area should show marked improvement by the fall of 1967, with almost two full years of deferment.

During the week of December 13, 1965, the herd was allowed to drift into the Sheep Pasture from the Upper North and South Ranges. The North Pasture was cleared and the gates closed on January 1, 1966. On January 19, the gates in the Elk Creek division fence were opened, and the herd allowed to drift into the Upper West and Southwest Ranges. On February 9, a group of 40 buffalo was moved back to the Upper West Range from the Lower West Range where they had moved after demolishing a gate in the contour fence.

On March 10, the Upper South Range and Sheep Pasture were cleared, and all remaining buffalo moved into the Upper West Range. The herd was moved from the Upper West and Southwest Ranges to the Lower West Range on April 25. Eight newborn calves were noted at this time. The exhibition pasture herd, consisting of 9 cows, 1 two-year bull, 1 yearling bull and 1 yearling heifer, was also selected and moved to headquarters.

We continued to have trouble with the wire gates on the contour fence, and stray bands of buffalo were gathered on several occasions during the course of the summer. All problem gates were replaced with galvanized metal gates later in the fall.

On April 26, the entire herd was moved from the Lower West Range to the Alexander Basin. The new Basin division fence had been constructed by this time, but the cattle-guard on the tour road had not been installed, so the herd was allowed to use the entire Basin range (comprising two new units, the Alexander Basin range east of the new division fence, and the Northside range west of the fence). The herd was finally confined to the Northside range on June 12.

Despite the fact that the entire herd was confined to the Alexander Basin and Northside ranges from May through June, there was very little indication of grazing on June 12, and virtually all grasses had matured and were going to seed.

The herd had a tendency to concentrate on that portion of the Northside range located near the east boundary between Mission Creek and the tour road, and overuse began to develop. Attempts at herding the animals away from this area were only partially successful, and, on June 30, the herd was allowed to drift into the Alexander Basin range. This solved the problem.

On July 8, the Northside Pasture was cleared of the few remaining animals, and the entire herd confined to the Basin. On July 14, all buffalo were moved above the contour fence into the Upper North range. During the next month, we experienced a continuous problem with buffalo tearing down the contour fence, and strays were moved out of the Basin on several occasions. Based on our experience with this fence during this period, it appears doubtful that the barbed wire type construction utilized on the contour fence will successfully hold buffalo under conditions of a deferred-rotation system, particularly during the rut. It may eventually have to be replaced with a woven wire fence.

The gates between the Upper North and Upper South ranges were opened on August 23, and the herd allowed to drift into the latter area. Between August 31 and September 21, we had a series of problems with the upper gate in the Elk Creek division fence, and groups of up to 100 animals were moved back into the Upper South range from the Southwest range. A galvanized metal gate eventually had to be installed temporarily. This section of fence is part of about 16 miles of interior fencing which is in need of complete renovation and, in some cases, total replacement. Chronic problems of this nature can be anticipated until the backlog of fencing maintenance is accomplished.

The annual buffalo roundup involved an eight-day period, October 6 through 13. On Thursday and Friday, October 6 and 7, all animals on the range were confined to the Upper South range, and the Exhibition Pasture animals were moved to the slaughterhouse corrals. On the following Monday, October 10, the range herd was moved into the corrals, and corral activities commenced shortly after lunch.

We had one close scrape with a bull which had had quite enough of the roundup. The bull became winded following about a five mile run, and holed up in a spring seep above the slaughterhouse in the Upper North range. He charged the first rider that rode in after him and succeeded in hooking one hind quarter of the horse as it was running away from him. The bull's horns passed on either side of the hind leg, opening up a 12 to 14 inch superficial wound in the groin area. As he hooked, he lifted the horse and rider some distance off the ground. Both horse and rider escaped, and the bull returned to the seep where he was left to his own devices. This was a new, inexperienced horse which was a little slow on the get away. The wound healed up quickly, and the horse has gained some invaluable experience which he'll not soon forget.

John Corcoran, D.V.M. with the U.S.D.A. from St. Ignatius, and Bob Manlove, State Livestock Inspector, Missoula, were on hand for the vaccinating and ear-tatooing work. A total of 39 heifer calves was vaccinated for brucellosis, and all calves were branded with a "6" on the lower left hip.

Numbered, metal ear-tags were placed on all live-sale animals destined for interstate shipment. A metal squeeze chute, especially designed and tested for buffalo by A. E. Thorson and Sons Equipment, Corvallis, Montana, for Yellowstone National Park, was purchased and installed prior to roundup. The squeeze worked exceptionally well for ear-tagging and live-sale animals, eliminating the problem experienced last year with horns broken against the sides of the wooden chutes. The chute is completely adjustable for use with all age classes of animals, and worked quite well for the experimental calf-vaccination project discussed in a later section. Although yearlings have been the largest age group worked in our chute, Yellowstone has handled their largest bulls with apparent ease. Thus, the chute will have considerable value for a variety of uses.

A total of 401 animals was tallied at roundup, three less than the population total projected from last year's figures. This is the second consecutive year that we have had three animals unaccounted for at roundup. We're now convinced that this represents an earlier error in our records, rather than an actual loss. Herd composition at the end of the year was as follows:

BISON HERD COMPOSITION, DECEMBER 31, 1966

Age Groups	Male	Female	Total	Animal Units
Calves	37	39	76	22.8
Yearlings	27	27	54	37.8
2 year olds	40	25	65	60.0
3 year olds	11	21	32	32.1
4 years olds	5	10	15	
5 year olds	7	11	18	
6 year olds	8	8	16	98.4*
7 year olds	5	7	12	
8 year olds	2	10	12	
9 year olds	2	6	8	
10 year olds	2	3	5	
11 year olds	0	3	3	10.0
12 year olds	0	1	1	
Totals:	146	171	317	261.1

*Average weight data not available for individual age classes within the 4 to 9 and 10-plus age groups. Available information considered adequate.

Animals in the 4 to 9, and 10-plus age classes have formerly been grouped in our tally records. Herd composition by individual age class was felt desirable, and an effort was made this year to maintain such a record. We found that the time required to accurately age individual animals in these age groups slowed down the entire corral activity. Of course, the slower the animals are moved through the corrals, the more difficult they become to handle. There is also a greater opportunity for injuries from hooking in the corrals. It was not felt that the value of the additional information warranted the time and risk involved in obtaining it.

A total of 78 calves, out of 82 born in 1966, survived to the end of the year for an initial production of 85 percent from 97 breeding-age cows, and a 95 percent calf survival. One orphaned heifer calf was sold alive on July 7, leaving 77 calves on the range as of December 31.

Three calves were orphaned during the latter part of April and the first part of May. We believe working the cows and calves on horseback during this period was the primary cause, although one calf apparently became separated from its mother as part of the herd moved through the Lower West range past the headquarters exhibition pastures. The calf was found in the lane on the east side of the pastures. Two of the orphans were raised on milch cows. The economics and risk involved in milch cow rental makes this a rather undesirable practice. The production figures from 1954 to the present are as follows:

ANNUAL CALF PRODUCTION, 1954 - 1966

Year	Production	Year	Production
1954	90%	1961	94%
1955	90%	1962	84%
1956	92%	1963	91%
1957	84%	1964	94%
1958	95%	1965	94%
1959	90%	1966	85%
1960	80%		

The 1966 production was somewhat below the 89.5 percent, 13-year average, and indications were that Leptospirosis pomona may have been implicated. This is discussed in Section I., Disease.

Breeding age cows returned to the range numbered 105, as compared to 97 in 1965. Overall herd sex ratio was 1:1.2, male to female.

As the herd was worked through the corrals, those returned to the range were split into two groups for initiation of the deferred-rotation grazing program. Range herd #1, consisting of approximately 172 animals or 139 animal units, was released to the Upper North range. Range herd #2, consisting of approximately 133 animals or 116 animal units, was released to the Northside range. The number of animals and animal units were approximate because the exact number of calves which mothered up to the respective herds could not be determined. The herds remained in their respective range units until January 3 and 4, 1967, when they were rotated into the next unit.

Twelve and 11 riders were used during the first two days of roundup. However, when the herds were moved in January, 1967, only five riders were available, and the moves were accomplished very smoothly. It appears that, under the deferred-rotation grazing system, fewer riders will be required for the annual roundup, and therefore fewer refuge-owned horses will have to be maintained. A reduction involving four or five horses may be permissible.

The butcher herd was brought down from the Sheep Pasture on November 25, and butchering commenced on November 28. This was the first year in the history of the Bison Range that a butcher was not hired to supervise the slaughtering operation. Refuge personnel had processed the total of 42 animals by December 2. With natural losses, the 1966 herd reduction totaled 87 animals.

2. Elk

On the basis of the annual big game census on February 26, the refuge elk population at the beginning of the year was believed to consist of 51 cows, immature bulls and short-yearlings, 4 adult bulls and the six animals in the Exhibition Pasture, or a total of 61.

There was only one known loss during the year, an adult cow found dead in Elk Creek in February. Cause of death could not be determined.

An estimated 15 calves were born during 1966. The cows in the Exhibition Pasture did not calve this fall, as we hoped they wouldn't, and the bull was not turned back in with them until September. As was indicated in last year's report, the estrus cycle of these cows was disrupted during an experiment from 1951 through 1956, and they have calved in the fall every year since. They should begin calving in the spring starting in 1967.

Fifteen animals, consisting of 7 adult cows, 1 yearling cow, 4 yearling bulls and 3 calves, were removed during the fall disposal program. The population at the end of the year was estimated at 60 animals.

The normal pattern of use on the range did not change this year, with the timbered and adjacent grassland areas in the Upper West range being the most heavily used.

3. Mule Deer

There were 254 mule deer counted on the annual census in February. However, considerable duplication in observations occurred on the south side of the range, and the population level was established at 200 animals. The first fawn of the year was noted on June 12.

In an effort to refine management of our deer herds, herd composition counts were initiated in the fall of 1966. The five sex and age class groupings developed by Taber (Journal of Wildlife Management 20 (1): Jan. 1956, p. 80) were used to determine population structure.

On the basis of our composition data obtained during the period October 17 - 20, the structure of the pre-fawn mule deer population was determined to be as follows:

Age and Sex Class	Percent of Total Population	Number in Total Population
Adult male	32.6	64
Yearling male	11.6	23
Adult female	29.5	58
Yearling female	26.3	52
Total:	100.0	197*

*200 original population estimate less 3 known losses prior to October.

We would expect the yearling male group to represent a smaller segment of the population, as yearling females have been under-represented in the fall removals due to the previous policy of not removing fawns and the difficulty of distinguishing yearling females from fawns.

The male to female sex ratio was 1:1.26. The adult female to fawn ratio was 1:1.06. Production for 1966 was calculated at 61 fawns. The fall disposal quota was based on the latter figure in an effort to maintain a stable population at about the 200 animal level. Removals within each age and sex class were determined on the basis of the following criteria: (1) the population should be manipulated for minimum reproduction to minimize requirements of a fall disposal program; and (2) a high proportion of adult bucks in the population would provide more trophy animals for greater public enjoyment. With this in mind, a desirable population structure was tentatively established, and removal quotas determined.

A total of 58 deer was removed from the following age and sex classes: adult male-4; yearling male-5; adult female-17; yearling female-12; fawn male-14; and fawn female-6. We had expected that the sex ratio of fawns would approximate 50:50. The preponderance of male fawns taken was quite unexpected. The removal of fawns should have been totally non-selective, and the sex ratio of animals taken somewhat representative of the sex ratio of the total fawn population. Following removals, it was calculated that the percentage of males in the total refuge population had been increased by approximately three percent. This was not as high as originally planned, primarily because of an error in establishing the removal quotas. However, if the sex ratio of the fawn population was in fact 2:1 in favor of males, the increase would approximate five to seven percent - a very desirable change in population structure.

The use and interpretation of this information must, of course, be tempered by the knowledge that its validity is subject to several assumptions which may or may not be correct. We will be in a much better position to evaluate this approach to deer management on the Bison Range in another year or two.

Seven known losses occurred during the year from so-called natural causes. Predation may have been the cause of the death of an adult doe found near the slaughterhouse on March 29, and dogs were implicated in the death of one adult doe along the west boundary fence. One pet fawn, "Snoopy", was brought in from Polson. This is the tamest deer we've ever had on the refuge.

The mule deer remained well distributed over the range, although the south side continues to comprise the major habitat area in terms of use. As indicated earlier, browse plants were in abundance, and very little indication of use by deer or other big game species could be found.

4. White-tailed Deer

The white-tail population was estimated at 175 animals at the beginning of the year. The first fawn was observed on June 15.

Herd composition counts were made during the period September 19 through October 5. The structure of the pre-fawn population was determined to be as follows:

Age and Sex Class	Percent of Total Population	Number in Total Population
Adult male	21.0	37
Yearling male	11.0	18
Adult female	54.0	95
Yearling female	14.0	25
Total:	100.0	175

The male to female sex ratio was 1:2.13. The adult female to fawn ratio was 1:.82. Production for 1966 was calculated at 78 fawns. The disposal quota was based on the latter figure, and a desirable total population level of about 200 animals. The same approach discussed in Section 3, Mule Deer, was utilized.

A total of 50 deer was removed from the following age and sex classes: yearling male-3; adult female-19; yearling female-12; fawn male-10; and fawn female-6. Surprisingly, the fawn sex ratio closely paralleled that which occurred in the mule deer disposal.

Assuming our population and composition data is reasonably correct, the fall removals accomplished almost exactly what we had hoped it would. The percentage of males in the population was increased 8 percent to 40 percent. Of course, if the sex ratio of fawns removed is representative of the entire fawn population, then the percentage increase would be considerably larger, and might approach the 50 to 60 percent considered ultimately desirable.

There were six known losses other than those removed during disposal. Two were adult females, one a yearling buck, and three were fawns. Two of the fawns had broken necks, and dogs may have been involved in one death. Three pet fawns were brought in during the year from various sources. One, dubbed "Bambi", was quite popular with visitors.

5. Bighorn Sheep

The total of 14 lambs born this year represents the best sheep production since 1963. No known losses occurred, and all lambs apparently survived the year. The total population at the end of December was estimated at 62 animals.

6. Antelope

An estimated 26 antelope fawns were born during the year. Twelve adult does and two kids were collected for B. W. O'Gara's reproductive physiology study, and there were four additional losses on the range (three adults and one fawn) from unknown causes. Based on an aerial count in July, and a comprehensive ground count in August, the population at the end of the year consisted of 29 adult females (including "Tanna"), 64 adult males, and 21 kids (including the pet male and female fawns donated by the Montana Department of Fish and Game in September), or a total of 114. By fall of 1967, it may be expected that the population will have approached 145 to 150 animals. A live-trapping and transplanting program will be desirable at that time.

Our pet doe, "Tanna", gave birth to twin fawns this year. However, by the end of the year both had died; one from an apparent Pasteurella multocida infection, and the second from an infestation of internal parasites. A large buck antelope transferred in from the Malheur refuge also became heavily parasitized, and had to be destroyed. Our local veterinarian indicated that this animal had the heaviest infestation of internal parasites that he had ever seen.

7. Rocky Mountain Goats

The first mountain goat kid ever produced on the Bison Range was observed on June 13. This brought our total refuge goat population to five animals.

The goats used the Headquarters Ridge area quite extensively throughout the summer and fall periods, and could frequently be seen grazing above headquarters in the early morning hours. They have developed extensive dusting areas or "goat wallows" on the south slope of Headquarters Ridge, in a rocky, open timber area. All five animals were observed from headquarters during the writing of this report.

8. Longhorn Steers

The four longhorn steers remained in excellent flesh throughout the year, although Tom, one of the older steers, became progressively weaker during November and December. On December 9, he became mired down in the marshy area east of the barn and had to be hoisted out with ropes. Tom and Jerry are both about 15 years old.

9. Black Bear

A black bear cub with a bright red collar was seen by visitors on the tour route, west of the slaughterhouse on September 4 or 5. This was undoubtedly a partially tame cub released on the refuge by a local resident. It was seen by itself on several later occasions (minus the collar) along Headquarters Ridge and Mission Creek. Fresh bear sign was noted quite frequently in the Elk Creek drainage, and along the Jocko River.

D. Fur Animals, Predators, Rodents and other Mammals

Coyotes became somewhat more common. The first active den found on the refuge in several years was discovered on Antelope Ridge on May 17. Two pups were observed at the entrance. One, and occasionally two coyotes were observed periodically throughout the range. There were probably five to ten of these animals on the refuge.

The Division of Wildlife Services has previously maintained an exposed 1080 bait stockpile near Gut Coulee for varying periods of time following their annual bait preparation program in the fall of the year. Prior to the 1966 bait program, we requested that they begin storing the bait off the refuge, which they arranged to do. This practice has undoubtedly been the primary reason for our low coyote population levels in the past.

There was only one bobcat reported during the year. Their tracks were frequently noted in the more rugged areas of the range when there was tracking snow on the ground.

We again experienced problems with dogs from neighboring farms and homes on the west boundary, particularly during March and April. Packs of two to five dogs were observed trailing through the northwest portion of the refuge. One was eventually shot near the slaughterhouse. Appeals to Flathead Agency Superintendent P. T. LaBreche, and refuge neighbors through the Range Ramblings column in the Ronan Pioneer helped curb this activity.

Three feral house cats were seen. Two of them were in residence at headquarters, despite efforts to remove them.

We apparently had a family of badgers raised in a clay bank east of the bison Exhibition Pasture. An adult with three young frequented the area during May and June. Two badgers, presumably of this family, were seen fighting in the Exhibition Pasture on June 28. There were relatively few badger holes noted on the range.

Striped skunks remained extremely common along Mission Creek and in the headquarters area. Despite the removal of three from the headquarters dump, a family, or part of a family, remained in residence beneath the manager's woodshed at the end of the year.

There was only one long-tailed weasel reported this year. This was one seen in the rocks on the east Exhibition Pasture road canal crossing.

Porcupines were observed occasionally, but were not considered particularly abundant. Three adults were seen along Pauline Creek on August 31. A porcupine feeding in the upper reaches of a tree in Pauline was the highlight of an April 20 tour for Pong Leng-EE, graduate student from Thailand attending the University of Montana.

Yellowbelly marmots were quite abundant in the headquarters area. Colonies of various sizes were present in the wood and post piles in the "Bone Yard", under the old cow barn, and in the rock jetty on Mission Creek below the horse barn.

Mountain cottontails were common residents. One very rare observation of a snowshoe hare was reported near Tower 2 on January 4, 1967.

Columbian ground squirrels were seen occasionally on the tour road east of Highpoint, but were not abundant. Yellow pine chipmunks were quite often observed in the timbered areas. The ingenuity of this species was graphically illustrated on July 27. A chipmunk was observed hopping up onto a large log, then leaping out two to three feet to the dried stalks of an unidentified forb, ride one to the ground, then very quickly remove and ingest the contents of the seed pod. The stalk was then released and the process was repeated. The chipmunk continued with this exercise for perhaps one to two minutes, completely oblivious of two riders on horseback within 30 feet of the log. In one instance, it grasped a large stalk midway up from the ground, and its weight was insufficient to ride it down more than to about a 45-degree angle. Thus suspended, the animal hesitated only momentarily, dropped to the ground, leaped onto the log, thence out onto the same stalk, grasping it very near the top, and succeeded in bringing it all the way down!

Evidence of pocket gophers was noted, but the animal was not considered particularly common. Meadow vole numbers continued to increase during the year, and were considered extremely abundant by the end of the year. Under the right conditions (principally a heavy snow cover), this species could do considerable damage to range forage plants.

Only one beaver was seen on Mission Creek, but evidence of their activities was common along much of the stream. Several large beaver dams were constructed this year immediately east of the refuge boundary on this stream. Muskrats were seen infrequently.

An adult raccoon with three young was reported seen near Quarters 2 in July by Mrs. Kraft. This is the first known record of an actual sighting on the Bison Range. Raccoon are extremely rare throughout the Flathead Valley, although they do occur in fair numbers along the Flathead River farther west.

E. Hawks, Eagles, Owls, Crows, Ravens and Magpies

Members of this group of birds were generally present in normal numbers during the year. The sparrow and marsh hawks were again our most common hawks.

Golden eagles were seen frequently throughout the year, with six individuals observed on February 23. The eagle nest north of Highpoint was inactive. We suspected that there were active nests on Headquarters Ridge and in the Fire Hole area, but were unsuccessful in locating them. No bald eagles observed.

Great-horned owls were common along the stream courses, and long-eared and short-eared owls were seen occasionally on the range. A short-eared owl's nest with six eggs was located near the slaughter-house on May 10. All hatched successfully. One pigmy owl was seen and photographed along the Jocko River on December 17.

Six ravens were observed on January 27. Neither ravens nor crows were common.

F. Other Birds

Small birds were present in normal numbers, but we did have the impression that fewer birds occurred in the headquarters area during the migrational periods. Results of mist-netting in this area were very poor. A total of 133 individual birds, representing 23 species, were banded. Many of these were netted along Mission and Pauline Creeks.

Observations of interest included: 20 evening grosbeaks at headquarters on January 30; one pileated woodpecker on Headquarters Ridge on February 9; two meadowlarks on range February 12; four evening grosbeaks at headquarters on February 15; 50 mountain bluebirds in one flock on Highpoint on March 18; tree swallows noted for the first time at headquarters on March 30; one mountain bluebird and one lazuli bunting near Highpoint on May 25; three mountain bluebirds near Highpoint on May 31; and first Wilson's warbler noted at headquarters on May 31 (a female).

G. Fish

Nothing to report.

H. Reptiles and Amphibians

Rattlesnakes were common, but not considered abundant. The den at the Snake Pit was active in the spring, and a new den was located on the boundary road switchbacks north of the Fire Gate. There were six large snakes at the latter den when it was discovered. An unusually large rattler was found under old bridge decking on the canal bank at headquarters in May, and four were killed on and adjacent to the public tour road during the summer months. Two were seen at the Snake Pit den on October 26.

Painted turtles were extremely abundant this year, and as many as 15 to 20 could frequently be seen on the Display Pond, or in the barrow ponds near the east boundary on Mission Creek.

I. Diseases

1. Buffalo

A total of seven buffalo died during the year, including three adults and four calves. These losses are discussed individually below:

July 1 - a calf, estimated to be about one week old, was found dead northwest of the slaughterhouse in the Northside range. The carcass had been picked clean by scavangers and cause of death could not be determined.

July 24 - a two to three-month-old heifer calf was found dead above the slaughterhouse in the Upper North range. The calf was in excellent

flesh when found and showed no evidence of injury or disease. The stage of decomposition was too advanced for necropsy.

August 1 - a bull calf, about one month old, was found dead east of Indian Springs in the Upper North range. Stage of decomposition was well advanced. Cause of death could not be determined.

August 15 - a seven-year-old bull was found dead in Pauline Creek, in the Upper West range. This bull had been seriously gored, and was observed along Pauline Creek on several days immediately prior to his death. Cause of death was undoubtedly the horn wounds and resultant internal injuries sustained during the rut.

September 20 - a heifer calf, about one month old, was found dead just east of Highpoint near the tour road. The animal appeared to be in good flesh, and there were no indications of injury or disease. Stage of decomposition was too advanced for necropsy.

November 2 - a two-year-old cow was found dead in Trisky, inside the Sheep Pasture. The carcass was badly decomposed when found, and cause of death could not be determined. This animal was part of the butcher herd, and may have sustained internal injuries during the corral activities in October.

November 4 - a six-year-old bull was found dead in the East Fork of Pauline Creek. He had obviously been dead for several months, and the cause of death could not be determined. We had observed a sick bull with a large horn wound in its side in this general area during the latter part of August. It's very likely that this was the same animal.

A yearling bull and a two-year-old bull, which had been brought into the slaughterhouse corrals for treatment, were butchered just before roundup on October 4. The yearling was extremely emaciated, and the meat had to be discarded. The carcass was examined by both Dr. Corcoran and Dr. Keyser, D.V.M. from Ronan, and the cause of its condition could not be determined. The two-year bull was stunted and somewhat dwarfish in appearance. The cause of its condition could also not be determined. The meat was adjudged fit for human consumption, and was allotted to the Flathead Agency for distribution to local schools.

On September 8, an injured bull calf was discovered during a routine horseback reconnaissance ride in the head of Trisky Creek. The calf had been gored in two places, behind the left shoulder and on the stifle joint. The wound behind the shoulder was the most serious, and was swollen to the size of a football. The animal was roped, given 10cc of long-lasting penicillin, and the wounds sprayed liberally with KRS fly repellent. It was then released. On September 23, the wound on the stifle joint had nearly healed, but the wound behind the shoulder showed little improvement. He was roped, given 6cc of long-lasting penicillin, and released (again on the basis that he would undoubtedly have a better chance for survival if he was left with his mother).

The calf was examined again during roundup. The wound on the stifle had completely healed, but the larger wound had made little progress. Dr. Keyser treated it with antibiotics, opened the wound and inserted packing material to permit drainage. The calf was then brought into headquarters and placed on a supplemental diet of grain and pellets. By the end of the year he was still a pretty scrubby looking calf, but his wound was healing nicely and he will undoubtedly survive.

The problem experienced with Pasteurella multocida in 1965 did not occur this year, and the symptoms of the disease were not noted in any of our buffalo. However, we did continue with efforts to learn more about the possible control of this disease.

An experimental vaccine developed by Dr. K. L. Heddleston, Research Microbiologist, National Animal Disease Laboratory, Ames, Iowa, was used on a test group of six calves at roundup. This work was under the direction of Dr. Cora Rust Owen, Research Microbiologist, Rocky Mountain Laboratory, Hamilton, Montana. Blood samples were taken at the time of vaccination, and again thirty days following vaccination. The vaccine had no apparent adverse affect upon the test calves, and Dr. Owen indicated that the vaccine did stimulate a very good level of immunity in the calves against P. multocida.

She further states, "Since the epizootics usually occur before the time of roundup, the vaccination of cows would probably be the best method for control. Annual boosters should not harm them, and should afford the calves better protection. Dr. Heddleston thinks, from what he has written me, that vaccinating the mothers should help protect the young." Vaccination of calves during roundup apparently is also a possible alternative for control.

The vaccination of all cows in the herd at roundup would be highly undesirable, and is an approach we would consider adopting only as a last resort. Vaccination of calves, of course, would be entirely feasible. Considerably more information on the vaccine is necessary before we could seriously consider its use on a broad scale. Drs. Heddleston and Owen are continuing to collaborate on its development and use.

P. multocida was identified in two antelope submitted for necropsy. This is discussed in the next section.

Duplicate blood samples were taken from the 42 buffalo butchered during the week of November 28, and submitted through Dr. Corcoran to the Montana Livestock Sanitary Board Laboratory in Bozeman for Brucellosis and Leptospirosis tests, and to Dr. Herbert G. Stoenner, Director, Rocky Mountain Laboratory, Hamilton, for more detailed Leptospirosis tests (the study of Leptospirosis is apparently one of Dr. Stoenner's special interests).

In the Brucellosis tests, 40 animals tested negative and two tested suspect. The two suspects were both two-year-old bulls, and were in the last group of male calves vaccinated with Brucella vaccine in 1964. Dr. Corcoran felt that a vaccination reaction may have been involved, although this seems doubtful considering the lapse of time since vaccination.

Dr. Stoenner tested his serum samples by the microscopic agglutination test and the plate test against ten different leptospira serotypes. He reported that, although some contained minor agglutinins against various serotypes, those which were positive were positive chiefly against Leptospira pomona. The two tests did not measure the same type of antibody, so it was possible for a serum to be positive in one and negative in the other. However, there was general agreement between the two tests. In the microscopic agglutination test, 24 animals tested positive. In the plate test, 27 animals tested positive. Dr. Stoenner stated, "From the results of these tests, it would appear that these bison had been infected with L. pomona perhaps six months to a year ago. Serums taken in early convalescence, when tested by the microscopic agglutination technique, should be positive in titers from 1:10,000 to 1:100,000. By the plate test, they should be positive in titers of 1:160 to 1:2560. You will note that none of the positive serums approached that range. Therefore, the antibodies present here are probably residual antibodies from infections experienced quite some time ago. From the history that you gave me of a reduced calf crop this fall (1966), it is entirely possible that the herd experienced an outbreak of leptospirosis during the past breeding season."

With the results of Dr. Stoenner's tests in mind, we found the results of the Bozeman test a little difficult to interpret. In their tests, all serums tested negative for L. pomona. However, Dr. Stoenner explained this apparent confliction in this way. The Bozeman laboratory uses the plate test only, because live cultures must be maintained for the microscopic agglutination test antigen. Also, they use a Fort Dodge antigen (a commercial product) which has a very low level of specificity at titer levels below 1:160. Thus, the Bozeman laboratory considers a herd infected with Leptospirosis only if one or more animals test at titer levels 1:160 or higher. Dr. Stoenner has developed an improved antigen for the plate test which has a high level of specificity at titer levels starting at 1:10. None of his serum samples tested higher than 1:40 with the plate test, but his low titer levels can be considered as accurate and positive indicators of residual antibodies in the animals which tested positive.

Dr. Stoenner later confirmed, by telephone, that the Bozeman lab. is still using the Fort Dodge antigen. He has recommended to the people at Fort Dodge that they adopt his improvements, and they apparently have indicated that they plan to do so. Thus, at some time in the near future, the Bozeman lab. (our routine testing facility) should be able to give us far more specific information on the incidence of Lepto. in our herd.

We became increasingly concerned during the summer with a so-called "face fly", which was first noted in the Flathead Valley about three years ago. It is an extremely persistent insect which occurs on the face and around the eyes of the animals it is (apparently) feeding upon. The flies caused serious irritation, and an inflammatory condition similar to pink eye, on our buffalo and horses in the headquarters area. We also noted that they kept the main herd in a constant state of irritation. The flys' activities appear to be limited to the daylight hours, as it leaves its victim during the night.

Specimens collected on September 24 from the tame buffalo and the horses were identified as face flies, Musca autumnalis DeGeer, by John F. Burger, graduate student from the University of California, Berkeley, who is doing research in Yellowstone National Park on the ectoparasites of the Park's wild animals.

Numbers of face flies have apparently increased markedly throughout Western Montana since it was first identified in this region. Stock growers are becoming quite concerned with it, because it reportedly has the capacity to cause severe economic losses in a herd of livestock. As far as we know, there is currently no effective method of controlling the fly in livestock. Obviously, the fly could become a very serious problem with buffalo.

2. Antelope

One of "Tanna's" twin fawns, a female, was found dead on June 30. The carcass was found next to the Exhibition Pasture fence, and we had assumed that it died from an injury involving the fence. However, necropsy performed at the Rocky Mountain Laboratory indicated that Pasteurella multocida was present. Five mice injected with pure cultures of P. multocida died within 24 hours, an indication of a highly virulent strain of P. multocida.

A fresh adult female antelope carcass was found west of the slaughterhouse on September 15. The animal was in excellent flesh, and there were no indications of injury or disease. Specimens collected from the animal by Dr. Keyser were examined at the Rocky Mountain Laboratory. Their diagnosis was P. multocida infection. They indicated that the infection was widespread throughout the body, and was the most virulent strain of P. multocida they had ever cultured.

The two additional antelope which died in the Exhibition Pasture, Tanna's second fawn and the adult buck transferred in from Malhaur, both died from heavy infestations of internal parasites. It is entirely possible that the animals' natural resistance to parasitism was overcome by an exchange of Montana and Oregon parasites. Parasitic fecal counts were made on all animals in the Exhibition Pasture complex, and only the antelope showed a high level of infestation. The remaining antelope were treated accordingly, and were all healthy at the end of the year.

3. Deer and Elk

Blood serums were collected from all deer and elk removed during disposal, and tested for the presence of antibodies of brucellosis. All tested negative. Our request for Leptospirosis tests on this serum apparently was overlooked.

4. Vegetation

In our 1965 annual report, we failed to mention an extensive infestation of fly larvae in chokecherries throughout the range. The bright orange larvae was identified as Diptera cecidomyiidae by B. A. Foote, University of Montana Biological Station, Bigfork. The larvae

consumed the pits, causing the cherries to become grossly deformed. The cherries soon dried up and lost their value as a wildlife food source.

Although the larvae were present during the 1966 growing season, they were very limited in number and had little affect upon the cherry crop.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

1. Refuge Work Program

a. Fence Construction and Repair: Seven new 8' x 12' cattle guards were installed early in the year, primarily to facilitate the self-guided tour program. Re-usable concrete forms were constructed, and concrete foundations were poured for all guards. Two of the guards were located on the headquarters Exhibition Pasture tour road, permitting removal of about one-half mile of big game fence south of the tour road. All material was salvaged. Twenty-three rods of new fence were required to tie the guards into the existing fences. Ten rods of the east division fence were rebuilt in conjunction with the installation of one of the cattle guards. The antelope-type, woven wire fence was utilized. Ten rods of big game fence were relocated in conjunction with installation of a guard in the Elk Lane.

A total of about 3.9 miles of new division fence was completed for initiation of the deferred-rotation grazing system. The fence was constructed of No. 9, 47" woven wire, set 16" to 18" above the ground. Seven-foot-long, T-type steel posts, set at 12' intervals were utilized. Galvanized metal gates, 12' long by 52" high, were installed wherever gates were required. Overall fence height was 5'4".

About 1.8 miles of the new fence were required from the slaughterhouse east to the boundary fence, to subdivide the Alexander Basin range. This created the Alexander Basin range on the east, and the Northside range on the west.

About 2.1 miles of the fence were required from the Elk Corrals to the old contour fence above the Snake Pit. This created the Upper West and Southwest range units.

The cost of construction for the entire 3.9 miles, which involved both the best and the worst terrain on the range, averaged $2,325.00 per mile. This is considerably less than any fence previously built on the Bison Range, including the barbed wire contour fence. Additional advantages include the fact that it does confine buffalo very effectively, and yet permits free movement and distribution of the other big game species (with the possible exception of elk, which have displayed a reluctance to jump it). It is also, obviously, much less aesthetically objectionable than the 7' to 8' big game type fence.

Approximately one mile of barbed wire contour fence was removed between the Snake Pit draw and the talus slopes east of the Fire Gate, following completion of the new division fence in this area. All material was salvaged.

Two large holding pens located north and east of the slaughterhouse, comprising one mile of big game fence, were eliminated during the year. These pens dated back to the elk roundups in the late 1920's, and were in an extreme state of disrepair. Their use was no longer considered essential to the refuge program.

Extensive rehabilitation work was accomplished at the slaughterhouse corrals during the summer months. The main corral chute and catwalk system from the tally shack to the scale platform was completely replaced. Native juniper posts were purchased and cut from the Jesuit Fathers' lands on Mission Creek immediately east of the refuge boundary. These posts were used to replace the relatively short-lived lodgepole posts used previously in the main chute.

The visitor catwalk was enlarged to more nearly accomodate the 200 to 400 annual visitors at roundup. A three-foot-high railing with heavy woven wire netting was installed for added SAFETY. A separate chute was constructed for the new squeeze chute discussed earlier. The chute leading into the kill pen, and the kill pen itself, were also completely replaced, utilizing juniper posts.

Extensive repairs remain to be accomplished in the corrals and, particularly, in the buffalo holding pens. However, the work completed on the cutting pens and main chute, starting in 1965, represented the most expensive and time consuming.

The entire 23 miles of big game boundary fence were gone over in November and repairs made as required. Fortunately, this fence is generally in excellent condition, and annual maintenance requirements are nominal.

b. Roads and Bridges: An additional layer of oil and 5/8" rock chips completed the preparation of a base on the Exhibition Pasture tour road. Chips were purchased from the Lake County Road Department, and hauled directly from the crusher in the Moiese Valley. The chips and oil were applied by the Montana State Highway Department on contract. Lake County contributed a crew and about 200 gallons of MC oil to prepare the cattleguard approaches and east shop access road for a layer of chips. This was necessary before a second coat of oil and chips could be applied, as sections of the road surface applied in 1965 were destroyed during the installation of the two new cattleguards. Total cost of the job was $1,118.42.

The Montana Highway Department also donated sufficient cold mix road surfacing material to widen the headquarters entrance road preparatory to installation of facilities necessary for the honor-type fee collection system to be initiated in 1967.

All refuge patrol roads and the self-guided tour route were bladed once during the year to remove oversize rock and annual weed growth. The new rock rake purchased in June was used extensively on

the tour road to remove oversize rock and move the finer gravel back onto the traveled surface. This implement will do much towards prolonging the life of the existing tour road.

A 15" x 18' corrugated aluminum culvert was installed in the Tower 3 road to eliminate a chronic problem with water seepage from a nearby spring. This section of the road was brought up to grade, leveled, and 16 cubic yards of gravel hauled in for surface material.

A low arch corrugated metal culvert was donated by the Indian Irrigation Service and installed by refuge personnel in the Mission "H" canal east of the elk pens at headquarters. With the surfacing of the Exhibition Pasture tour road, this is the only suitable canal crossing we have for crawler tractors near headquarters. The old existing bridge was removed.

The upper Mission Creek bridge, which was completely renovated in 1965, was given a coat of wood preservative on all exposed upper surfaces in August.

c. Building Maintenance

Building #11: The south exterior wall of the horse barn was wire brushed and given two coats of white paint and trimmed with green paint. This was a contract job.

Building #19: All exterior walls were wire brushed and given two coats of paint, white with green trim. This was done under contract.

Building #22: The exterior walls of the oil house were cleaned, brushed and given two coats of white paint, and trimmed in green. The roof received a coat of green penta base stain.

Building #26: Major renovation and maintenance of the slaughterhouse building was nearly completed during the year. The deteriorated concrete floors, which had been hand mixed with high dirt content, river run sand and gravel, were removed and replaced with a 5" ready-mix concrete floating floor. A layer of fine sand and heavy plastic preceded the actual pouring. The floors were reinforced with standard concrete wire mesh, drains installed, and the surfaces sloped to the center of each room for proper drainage. A one-half inch mastic was installed around the perimeter of each floor, giving them a floating quality for expansion and contraction. Concrete footings were poured under the north wall of the kill room, and the two interior walls separating the butchering, cooling and shipping rooms, to replace rotted foundation sills and prevent water damage to walls and new sills.

The interior walls of the butcher room were sealed with 1/4" waterproof flexboard sheeting to facilitate cleaning and for protection of the walls from moisture. A new concrete falling block was poured between the kill chute and the butcher room. The stairway in the butcher room was removed and an outside exit provided for access to the kill chute. This provided considerably more working space in the butcher room. The interior wall at the west end of the butcher room was also removed and replaced with a pipe railing for added work space.

Quarters # 63 and #64: The wood shingle roofs of these two residences were brushed and given one coat of green penta stain, under contract.

Building #82: The display shelter in the picnic area was given a coat of redwood penta base stain.

Buildings #99 and #100: The two rest-rooms installed by Job Corps crews in June were given a second coat of redwood stain in August.

The gasoline and diesel outside storage tank shelters were both given a coat of penta base stain, green on the shingled roofs and redwood on the log framing.

d. Automotive Equipment Maintenance: Major repair and maintenance work accomplished included; complete engine overhaul and installation of new master clutch in TD-9 tractor, I-49428; ignition system rewired on TD-18A, I-50885; new master leaf and track repairs on "22" Cat, I-18333; new brake lining, U-joints and rear wheel seals on Ford 4 x 4, I-75650; major engine overhaul on International stake-dump, I-49810; necessary minor repair and adjustments and 5,000 mile preventative maintenance checks performed as required.

Metal cattleguard-wings were fabricated for the Ninepipe Refuge. The fence-unrolling device developed by Maintenanceman Krantz was also fabricated in the shop.

The new snow-plow purchased in June was installed on the new 5-yard GMC dump truck, I-76878.

e. Miscellaneous: Approximately two miles of refuge-owned and maintained telephone line extending from headquarters to the slaughterhouse was transferred to cross-arms installed on the existing power line poles. This eliminated the need for paralleling lines and improved the aesthetic qualities of the area along the last two miles of the public tour road.

Negotiations were completed in October for conversion to nearly complete commercial telephone service and maintenahce. When the new service is brought in to headquarters from the Charlo exchange, approximately two and a half miles of refuge-owned and maintained line on the east side of the range, and five miles of refuge-owned line between Ravalli Hill and St. Ignatius may be removed.

More than forty informational and directional signs were constructed by refuge personnel early in the year for the new self-guided tour program. Sufficient two-inch redwood material was acquired gratis from a new, surplus water tank through the Flathead Agency at Dixon to complete all signs.

The large cooperative BSF&W and BIA directional sign located at the Dixon turn off was brought to the shop, sanded and refinished in the standard redwood and yellow colors. The area around the base of the sign was treated with soil sterilent in October, for the control of weeds. Several signs in the headquarters area were also refinished.

The old stone drinking fountain located in front of the office (which made so many public enemies for the Bureau) was removed and replaced with a rustic post-type fountain. The water pipe was installed in the center of a juniper post, with the fountain head and tap protruding from the inside of the post. Stones were placed so as to elevate the youngsters. We liked the results so well, five more were constructed for future installation in the picnic area.

Through upstream diversions and channel changes on private and tribal lands, the Jocko River has gradually been forced north into a section of idle refuge land which encompasses the clayey banks on the north side of the stream. This process started, perhaps, ten years ago. When the stream reached the 70' to 80' banks about two to three years ago, a bank erosion problem gradually developed.

Until the summer of 1966, we had been under the impression that the point at which the actual erosion was taking place was on tribal lands. A look at a recent set of aerial photographs revealed the magnitude of the stream change, and that the bank erosion which had kept the lower reaches of the Jocko turbid for the past one to two years was, in fact, a refuge responsibility.

With the cooperation of the Flathead Agency, which contributed the use of a low-boy and operator, we moved a dozer into the area on August 8. A temporary gravel dike was pushed up along the eroded bank, and by 8:00 p.m. the same day, the five to six miles of the lower Jocko had cleared up and the water quality of a very fine stretch of trout stream had been restored. Heavy rock rip-rap material will be required for permanent protection, and is scheduled for 1967.

An additional 220-gallon water storage tank was installed in the headquarters pump house, to eliminate a water shortage that had developed during heavy use periods.

Hay meadows and animal exhibition pastures were irrigated and fertilized as required. Soil samples were taken in the bison exhibition pastures, and a fertilization plan developed with the assistance of Lake County Agent Ed Bratton.

The old "bone pile" in Gut Coulee was gathered up and buried, and a new sanitary land fill arrangement provided for disposal of offal, etc. The exposed soil will be reseeded in the spring of 1967.

Cleanup, mowing and general maintenance of headquarters grounds and the picnic area consumed a large share of our time, particularly during the tourist season.

2. Kickinghorse Job Corps Work Program

The Kickinghorse Job Corps Center received its first complement of corpsmen during the latter part of January, and was officially dedicated on February 5.

During the initial organizational period, there was a shortage of Center staff personnel, equipment and indoor work facilities.

Consequently, very little was accomplished on formal work project proposals submitted and approved in 1965. As Work Leaders were in shortest supply, we offered to work a crew of corpsmen along with our regular refuge crew, until the Center staff had a chance to get their feet on the ground. We received from two to seven corpsmen throughout February and early March. These men assisted with the cattleguard installations, fence construction and removal of unneeded fencing, relocation of the telephone line to the slaughterhouse, etc., under the supervision of refuge personnel. In retrospect, we believe the corpsmen worked harder and learned work skills more quickly in this situation than they did later in Center work crews.

We also offered the Center the use of our carpenter shop for winter work projects. They utilized the shop for about three months, while building a number of prefabricated outdoor pit-type toilets. They later installed two of the toilets on the self-guided tour route near Highpoint. The rest-rooms were installed complete, with stainless steel stools and 36" corrugated galvanized pipe pit liners. This was a formal refuge work project, involving the construction and installation of six such rest-rooms. Four remained to be installed at the end of the year.

An additional crew of corpsmen started on the Exhibition Pasture fence renovation project in early April. The 1.5 mile perimeter fence and one-quarter mile division fence were finally completed on September 29. This project involved replacement of all wooden line posts with 10' U-type steel posts, and replacement of corner and brace posts with native juniper posts cut and furnished by the refuge. The existing wire was utilized. In addition to labor, Job Corps contributed approximately $3,000.00 to this project through the purchase of steel posts.

By the end of the year, all material had been received for the Ninepipe fisherman access road and parking area project, and renovation of the Mission Creek Bridge. Work on the bridge was scheduled to commence on January 23, 1967. Both projects should be completed by June 30, 1967.

Forty-two of the 44 projects submitted for the Job Corps work program in Fiscal Year 1967, were resubmitted for Fiscal Year 1968. With construction and landscaping of the Kickinghorse Center now nearing completion, we anticipate considerably more progress with work projects in Fiscal Year 1968.

B. Plantings

1. Trees and Shrubs

Approximately 200 trees and shrubs were planted in residence yards, shelter belts, and for concealment of administrative buildings. Species included scotch pine, blue spruce, honeysuckle, dogwood, American plum, Siberian crab, Nanking cherry, common lilac and caragana. Plantings outside of the yards were enclosed with woven wire fence to prevent deer damage. Nearly 100 additional trees and shrubs of this group were planted in our small nursery for future use. Nursery stock

was purchased from the State Forestry nursery in Missoula. There had only been one or two losses by the end of the year.

Three silver poplars were transplanted from our nursery to a planting between the shop and storage buildings and the Exhibition Pasture tour road.

2. Upland Herbaceous Plants

The three acres of dikes and fill areas adjacent to the display pond reseeded in 1965, did extremely well. This has become a very attractive area. The ladino clover in the mixture used attracted deer throughout the summer months, and this became a popular stop along the refuge entrance road.

C. Collections and Receipts

None.

D. Control of Vegetation

1. Biological Control

The history of the goatweed beetle, Chrysolina quadrigemina, on the Bison Range was discussed in detail in our 1965 Annual Report. The refuge beetle population remained at a very low level during the years 1959 through 1965. Control of goatweed, Hypericum perforatum L., by beetles during this period was insignificant. As a result, goatweed spread rapidly throughout the range and by 1965 had infested an estimated 6,000 to 8,000 acres.

The apparent inability of the beetles to increase to the extremely high, and effective, population levels existing prior to 1959 remains difficult to explain. Several factors may be involved. There is the possibility that the goatweed beetle in Montana is on the very edge of its adaptable range. It's also possible that the weather has consistently been unfavorable for successful reproduction. Or, it may be that, following an initial surge in population numbers subsequent to their introduction, the beetles have simply leveled off and the population become stabilized. This phenomenon is not uncommon to introduced exotics. Whatever the case might be, we decided that an additional introduction might be of value. Therefore, early in 1966 we made arrangements for two separate introductions - one from California and one from Northeastern Washington. The beetles in Idaho and Washington have apparently continued to control goatweed rather effectively, and we felt these beetles might be more acclimated to our area.

On June 2, 1966, we received 2,882 beetles from Dr. Lloyd A. Andres, Leader, Biological Control of Weeds Investigations, USDA, ARS, Entomology Research Division, Albany, California. The beetles were released in the following quantities and locations: (1) 500 in the large draw west of the slaughterhouse, above the division fence; (2) 382 (by their count, not ours!) in Gut Coulee, at the junction of the east and west forks; (3) 500 above the tour road south of the Pink Gate; (4) 500 about 100 yards above #3 release site; (5) 500 below tour road in the head of Trisky Creek; and (6) 500 in the head of

Pauline Creek below the tour road. The beetles had survived the shipment from California very well, and were released on the same day that they were received.

As the season progressed, we had increasing indications that the beetle population was considerably higher than in 1965. We also were advised that beetle numbers were down in Washington, and that a collection would be difficult. Consequently, we abandoned plans for a Washington introduction.

Although beetle numbers were vastly improved in 1966, our hopes for significant control of goatweed were premature. Some localized control was observed in isolated areas, but beetle work generally was ineffective.

2. Chemical Control

When it became apparent that the status of the beetle population was to remain relatively unchanged, we continued with plans for chemical control of goatweed. We felt that the most effective approach would be to concentrate on a single drainage, and attempt to give it complete coverage. The Pauline Creek drainage was selected, primarily because goatweed has not become as firmly established on the west side of the range as it has on the north and east sides. In other words, we have the opportunity to keep the infestations somewhat confined. This is also the most practical approach, as we could never possibly cover all areas infested within one or even two growing seasons given unlimited funds. The fact that this drainage would be under buffalo grazing deferment until 1967 was also an important consideration.

Spraying with ground equipment was chosen as the best method for application because of the terrain, and because the chemical could be applied much more selectively than with aerial equipment. Results were quite good throughout the area sprayed. Initial kill ranged from 50 to 60 percent on the hard-to-spray rocky slopes, and from 85 to 95 percent on the balance of the drainage. In some locations, all visible goatweed plants appeared to be dead. We succeeded in spraying about 90 percent of the infested areas within the drainage before plant development passed the stage of susceptibility.

The actual kill resulting from the aerial spraying of goatweed in the head of Elk Creek in 1965 was about as we expected. Where the helicopter applied the mix at the proper speed and height, kills ranging from 90 to nearly 100 percent resulted. However, the kill achieved throughout much of the area sprayed was very disappointing. Future control work in terrain of this nature will, of necessity, be limited to ground application only. We had about a 95 to 97 percent recovery of shrub species within the spray area. In terms of available forage, the shrubs were set back from one to perhaps three or four years in some cases. This is obviously the most undesirable aspect of aerial application.

Canada thistle control work was continued, with emphasis placed on infestations along roadsides, canal banks and similar areas. Initial results generally appeared quite good. However, the higher

mixing rate of 1:100 was obviously much more effective than the 1:30 rate.

Results from the 1965 Canada thistle control program were quite varied. Actual kill in those areas sprayed experimentally with a helicopter was generally very poor, and we believe the small quantity of mix which was actually applied per acre was the contributing cause. Thorough wetting of the plants seems to be necessary for effective results. The areas sprayed with ground equipment looked much better, with actual kills of 50 to 95 percent indicated.

E. Planned Burning

The irrigated portion of the bison exhibition pastures was burned prior to the 1966 growing season to remove excessive dead vegetation, and as a means of controlling the high meadow vole population.

F. Fires

There were no fires on the Bison Range during 1966. In view of the dry condition of the range during much of the summer period, we considered ourselves very fortunate.

IV. RESOURCE MANAGEMENT

A. Surplus Buffalo Disposal Program

1. Live Disposal

Five female and five male long-yearlings were donated to the New Mexico Department of Game and Fish. The animals were loaded very smoothly into a specially designed trailer brought in by New Mexico personnel, and made the trip to their new home without mishap.

A total of 30 long-yearlings and one orphan calf was sold during the year. Following is a summary of the live disposal:

Consignee	Number	Sex
Department of Game & Fish State Capitol Sante Fe, New Mexico	5 5	Bulls Heifers
H. E. Furgeson % Mt. Haggin Livestock, Inc. Anaconda, Montana	1 2	Bull Heifers
Stanley Girtler Winona, Minnesota	2	Bulls
Marion G. Morgan Alzada, Montana	1 2	Bull Heifers

Consignee	Number	Sex
Dubois Volunteer Fire Dept.,		
% Arden Coad, Chief	1	Bull
Dubois, Wyoming	2	Heifers
Leonard W. Murray		
Rt. 2, Box 291-M		
Linden, California	2	Heifers
Glen L. Lohmann	1	Bull
Sentinel Butte, North Dakota	2	Heifers
E. M. Hayes		
St. John, Washington	3	Heifers
Tom Evans	1	Bull
Omak, Washington	2	Heifers
Robert Schall		
Arlee, Montana	1	Bull
Darrel Shulsen	1	Bull
Sandy, Utah	2	Heifers
Frank Howard, Jr.		
139 East Main		
Grangeville, Idaho	1	Heifer
W. C. Parker	1	Bull
Garrison, North Dakota	2	Heifers
Wesley Mapston		
Arlee, Montana	1	Heifer Calf

2. Meat Sales

The age and sex composition of the 45 buffalo butchered was as follows:

Age	Male	Female	Total
10 and over	6	4	10
4 to 9 years	10	5	15
3 years	4	1	5
2 years	9	4	13
1 year	1	0	1
6 months*	1	0	1
Totals	31	14	45

*This calf broke its neck against the corrals at roundup, and was counted in the disposal quota.

Meat applications were handled in the same manner as in 1965. A total of 509 applications was received from individuals, as compared to 564 in 1965. The number of orders filled for the respective years was 90 and 250. The reduction in orders filled was due, of course, to fewer number of animals butchered. Applications received and orders filled for 1965 and 1966 are summarized below. The four orders not filled in the club category resulted from cancellations.

Category	Applications Received		Orders Filled		Total Animals Sold	
	1965	1966	1965	1966	1965	1966
Regional Office					1.5	.75
Donation to schools w/Indian children in attendance					3.0	3.0
Clubs	48	41	45	37	20.5	16.75
Commercial	22	17	13	2	6.5	1.0
Individual	564	509	250	90	62.5	22.5
Total Animals Sold					94.0	44.0*

*Yearling bull butchered October 4 was adjudged unfit for human consumption and discarded.

The drawing for commercial and individual applications was held on October 3, with Rev. Robert C. Larsson, St. Ignatius, and Albert Rennie, Flathead Agency, Dixon, officiating.

After notices were sent out to successful applicants, a total of only 15 cancellations occurred, as compared to 77 in 1965. This was undoubtedly due to the fact that meat was $15.00 per quarter cheaper than it has been for several years.

A total of 26,820 pounds of buffalo meat was delivered, and we experienced no problems with transportation or meat spoilage.

It is rather difficult to calculate refuge costs for live sale and butchered animals. However, we estimate that at the time live sale animals have been sold we have approximately $10.00 to $20.00 per head invested. This includes only those costs directly related to the live sale program. By the time sales are completed on meat processed from the butcher disposal, we have about $75.00 to $100.00 invested in each animal. Again, this involves only direct costs. With these figures in mind, the current sale prices for live and butchered animals become somewhat unrealistic. Sale prices in 1966 were $235.00 each for live sale animals, and $50.00 per quarter, or $200.00 per carcass for butchered animals.

3. Sale of Buffalo Hides

In January 1966, four buffalo hides remained from the 1965 disposal. One bull hide and skull for a live mount were donated to the Northwest Indian Cultural Center, Gonzaga University, Spokane, Washington. Three of the hides, all culls, were sold at the reduced price of $7.50 each.

Requests were received for almost twice the number of hides available from the 1966 disposal program, and initial sales had been completed weeks before butchering commenced. At this writing, 42 hides have been sold for $907.50, and sales are pending for one live mount at $50.00, and one imperfect hide at $12.50. At these prices, the average return per hide from the 1966 disposal will amount to $22.04, which we consider excellent.

4. Sale of Skulls

During 1966, 78 buffalo skulls were sold for a total of $372.50. The current prices for these by-products are; mature cow skulls $3.00; small, medium and large bull skulls $5.00, $10.00 and $20.00, respectively. When buffalo are skinned for mounts, the hides and skulls are sold as a package, and the sale price for the skull is included under income from hides.

5. Donation of Hides and Skulls

In addition to the live mount mentioned in Section 4, a large bull skull was donated to the Northwest Indian Cultural Center. Several small skulls were also donated to various teachers during the year, for use in the classroom.

B. Surplus Elk and Deer Disposal

Fourteen elk and 106 deer taken during the fall disposal were shipped to various schools in Montana for use in the State's hot lunch program. One elk was sold to the County Extension Office in Ronan, Montana, for use in the Lake County 4-H Council Junior Fair, held annually in August. Authorization for this sale was made several years ago. The 10¢/pound handling charge applied. The two remaining deer consisted of one found dead, and counted in the disposal, and one of two collected for the University of Montana. The animals were used for class demonstrational purposes. The meat from one of these animals was salvaged.

Costs for collection of the deer and elk were computed following completion of the disposal program, and are summarized below:

	Deer		Elk	
		% of Total		% of Total
Labor	$1,189.60	88	$464.25	88
Materials	111.22	8	42.89	8
Equipment	50.00	4	20.00	4
Total:	$1,350.82	100	$527.14	100
Cost/Animal	12.86		35.14	
Revenue anticipated	5.94*		27.65*	
Difference:	-6.92		-7.49	
Man Hrs. Required	356		148	
Hrs./Animal	3.4		9.9	

(Continued)	Deer	Elk
Total Pounds Meat	7,014	3,612
Avg. Weight/Animal	66.8	240.8
Cost/lb. to Collect	.192	.146
Cost/lb. to Collect-less hide revenue	.163	.130
Cost/lb. to Schools	.06	.10
Difference:	-.103	-.03

*Includes handling charge plus average receipts from sales of hides, i.e. $1.93 for deer and $3.00 for elk.

For comparative purposes, cost-revenue data for 1965 and 1966 are of interest:

	Deer		Elk	
	1965	1966	1965	1966
Cost/Animal	13.88	12.86	31.96	35.14
Revenue/Animal	7.44	5.94	28.25	27.65
Difference:	-6.44	-6.92	-2.71	-7.49

The principal reason for the increased difference between cost of collection and revenue received was that fawns and calves were taken in 1966, the first year that this age group has been included in the disposal quota since 1952. An appropriate increase in the handling charge should rectify this in the future. As the above figures indicate, the inclusion of fawns in the disposal did substantially decrease the cost of collection per animal, despite increased labor costs (in terms of hourly wage rates).

2. Sale of Elk and Deer Hides

Twenty elk hides and 88 deer hides were sold during the year, for a total of $267.30. Sixteen of the elk and 22 of the deer hides were from the 1965 disposal program, and the balance from the 1966 disposal. Currently, we have a balance of 11 elk hides, 4 damaged adult deer hides, and 35 fawn deer hides remaining to be sold. Forty-seven white-tailed deer tails, at 35¢ each, were sold for $16.45.

C. Proceeds of Sales

Total receipts from sales for the period January 1 through December 31, 1966 were as follows:

Live buffalo	$7,100.00
Butchered buffalo	8,234.35
Deer and elk meat	782.04
Buffalo hides	730.00
Deer hides	216.80
Elk Hides	50.50
White-tailed deer tails	16.45
Skulls and antlers	504.00
Employees horse-grazing fees	80.00
Employees wood purchases	80.50

L&WC Entrance Permits	3,381.00
Marsh concession	586.67
Sale of surplus, moldy grain	53.00
Sale of used posts & wire	488.87
Sale of surplus, used property	473.94
Total Sales	$22,778.12

V. FIELD INVESTIGATION OR APPLIED RESEARCH

A. Antelope Reproductive Physiology Study

University of Montana Graduate Student B. W. O'Gara's study relating to antelope reproductive physiology involved animal collections on the Bison Range and in Yellowstone National Park. Twelve adult does and two kids were collected during the year on the refuge, and the Bison Range phase of the study was completed in July. We had not originally anticipated the need to collect fawns, but the collection of a doe on June 23 necessitated that the fawns also be taken, for obvious reasons. We approved this collection with reluctance, and then only with assurances from Mr. O'Gara and his University advisors that the fawn specimens would be fully utilized for scientific purposes.

It is our understanding that the Yellowstone Park phase of the study will be completed by fall of 1967 or early in 1968. Mr. O'Gara's thesis will be prepared at that time.

B. Antelope Behavior Study

By the end of the year, University of Montana Graduate Student Peter Bromley had completed field investigational work for his antelope behavior study. His thesis should be available by mid-1967.

C. Buffalo Weight Studies

The various refuge studies relating to live weights of the different sex and age classes, which have been taken at roundup and at butchering, were continued in 1966. The information accumulated during the past ten years or so is considered adequate for the development of average weight data, and these studies will be discontinued beginning in 1967.

D. Buffalo Age, Weight and Longevity Study

Only 18 of the 27 specially marked animals which should have been in the herd were tallied and weighed during roundup. This has been a chronic problem since this study was initiated in 1963. The difficulty is in reading the brand and/or special study mark. Buffalo simply do not take brands as cattle do, and many of the brands are eligible. One of the specially marked animals was culled into the butcher herd when it was discovered that we had a duplication. Seventeen of these animals were weighed and returned to the range. Considering the relatively small size of our herd, we believe it is impractical to increase the sample size of this group above its present level. Of course, the validity of this small sample is subject to question.

E. Buffalo Measurements

Body measurements have been taken of buffalo butchered every year since 1956. We believe the information accumulated is sufficient, and this project will be discontinued beginning in 1967.

F. Buffalo Pregnancy and Lactation

All cows butchered since 1951 have been examined, and a pregnancy and lactation record maintained. We do not feel that additional information would be of any particular value, and plan to discontinue this project also beginning in 1967.

G. Average Weights and Weight Relationships of Deer and Elk

Weight data has been accumulated on deer and elk during the fall disposal programs since about 1952. This project was curtailed beginning in 1965, and will be discontinued entirely starting in 1967.

H. Experiment in Tranquilizing and Anesthetizing Drugs

No field work was accomplished on this project during the year, and it was terminated for practical reasons in June. We did not feel we had sufficient need to justify the time, expense and risk to experimental animals required to develop this as a feasible capturing technique for buffalo and other big game animals.

I. Refuge Herbarium

A special study of the "Vascular Flora of the National Bison Range * * *" was approved on August 15. Principal investigators were Dr. John H. Thomas, Curator, Dudley Herbarium, Stanford University, Stanford, California, and Mrs. Carol Bromley, undergraduate student at the University of Montana. Objectives are to (1) provide a complete checklist of the native and introduced vascular plants within the confines of the Bison Range, and (2) to deposit specimens in the herbaria of Stanford University, the University of Montana, and the refuge reference herbarium at the National Bison Range. At least one specimen of each plant species collected is to be made available to the refuge.

Field work on this study was completed during 1966, and plant identification work is currently in progress. The study is to be completed by December 1967.

J. Range Condition and Trend

In conjunction with the new deferred-rotation grazing program, we have made arrangements with range specialists at Montana State University, Bozeman, for the establishment and reading of permanent range and browse transects in the spring of 1967. It is anticipated that these transects will need to be read every three to five years, and will provide information basic to future evaluation of our grazing program, and to the development of proper stocking levels in all species of big game on the refuge.

K. Range Interseeding Study

Arrangements were completed early in the year for a cooperative range interseeding study, involving Montana State University, Bozeman, the Lake County Extension Office, the Soil Conservation Service, and the Flathead Agency. Range Extension Specialist Don Ryerson developed the study plan, supervised the field work, and will periodically evaluate results. The Agency donated equipment and personnel to assist with the field work. The two local County Agents arranged for donation of specialized equipment from local equipment dealers, and also assisted with field work.

Four study plots were established, two on the idle refuge lands east of Highway 93, one in the northeast corner of the Lower South range, and one on private lands adjacent to the refuge on the east boundary. Of course, refuge involvement was limited to those plots on Bureau lands.

Objectives of the study involved: (1) comparison of herbicides with mechanical scalping for elimination of competition; (2) native grass and shrub species adaptation; (3) comparison of grazing by domestic livestock and big game animals (later phase). Domestic livestock will be grazed on the study plot established on private lands; and (4) evaluation of range interseeding as a method of range improvement on the Bison Range and Western Montana rangelands generally.

The plots were established on April 12, 13 and 14. Initial evaluations by Ryerson during the week of June 13 indicated that the herbicide band application had been a total failure, in terms of control, but that germination and establishment of seedlings on the remaining three plots appeared excellent. These plots will be evaluated again in the spring and fall of 1967, and a more complete analysis of the experiment can be made at that time.

VI. PUBLIC RELATIONS

A. Recreational Uses

The anticipated increase in public use during 1966 did not materialize. The total estimated number of visitors was only slightly above the 80,000 recorded for 1965. We believe this was largely due to a road construction project on Interstate Highway 93, between Allentown and Ronan. All directional signs leading to the Bison Range from the north (and Glacier Park) were removed for the duration of the construction job, which involved ten or eleven months of the year.

The heaviest period of use again occurred during the period April through September, although visitation was unusually high during the early spring and late fall periods. This was no doubt due to the extremely pleasant weather conditions experienced at those times.

The previous guided tour program was terminated in favor of a self-guided auto tour program, initiated on June 17 and extending through Labor Day, September 5. The new tour program was very well

received by the visiting public, and went much more smoothly than we had anticipated. The lack of adequate auto turnouts created a minor problem during periods of heaviest use, but otherwise the facilities were entirely adequate.

There were 2,540 cars on the tour, with an average of 4.08 persons per car, or a total of 10,354 people. This compared to the 2,775 people registered for the guided tours in 1965, the highest number recorded during the history of the guided tour program. The new program prompted much favorable publicity in local and regional newspapers, and was especially welcomed by local residents.

A tour leaflet was prepared to enhance visitor enjoyment, and its various sections were keyed to signs along the tour route. Much favorable comment was received on this aspect of the program.

It is entirely possible that use of the self-guiding tour route could, at some time in the future, reach a level which would negate the value of the tour as a quality wildlife oriented recreational experience. However, we believe this can be avoided by the application of controls as the need arises. Means available for regulation of use include; (1) distributing use over a longer period of time. The early summer and early fall months are generally the most desirable for a tour of this nature, and much of our local use would occur during these periods if the tour was available; (2) regulating the period of entry to the tour route; and (3) imposing restrictions upon the number of people taking the tour at any one time or during any one day.

For the reasons enumerated above, and to give people an opportunity to see the range and its associated wildlife at the more desirable times of the year, the tour season will be increased by about six weeks in 1967. The tour will be open from June 1 through September 30.

Forty-nine states, the District of Columbia, and twelve foreign countries were represented on our tour register. However, over 72 percent of the people hailed from the five western states, as follows: Montana - 43.5%; Washington - 11.5%; California - 10.2%; Oregon - 4.1%; and Idaho - 3.3%. Each car was on the 19-mile tour route for an average of 1.7 hours, which was considerably less than we had expected.

Reaction to the tour was not always, of course, completely favorable. In fact, a few comments received were downright derogatory. On July 10, a gentleman from Iowa, disappointed at not having seen any animale, accused us of running a tourist trap! This completed our initiation into the public recreation business.

Fee requirements under the Land and Water Conservation Fund Act of 1964 were increased this year to include entrance permits. We had an estimated 15,000 visitors during the collection period, June 17 through September 5. Approximately 33 percent, or 4,950 of these visitors had an annual entrance permit when they arrived. An estimated 20 percent, or 3,031 did not purchase an entrance permit

for their visit. A total of 274 annual $7.00 permits, and 1,421 one-dollar and 84 fifty-cent daily permits was sold during the year. Entrance permit sales totaled $3,381.00.

The mandatory registration of all self-guided tour participants and the collection of entrance fees combined to create an almost unmanageable situation in the refuge office during the tour and fee collection season. During heavy use periods, the services of one person were required almost full time to handle this aspect of the program. We are hopeful that conversion to a self-registration and honor, or self-service, fee collection system in 1967 will decrease the demands imposed on the refuge staff during this period. It will still be necessary to have two people on duty on weekends, one to supervise the tour program, and one person available in the office for the sale of annual entrance permits.

B. Refuge Visitors

Jan. 5 Mr. John Corbett, Flathead Agency, Dixon, Law Enforcement Officer (concerning deer killing case)
Jan. 11 Messrs. Robert D. Newman & Robert Hium, BLM, Missoula (Wildlife Photoes)
Jan. 12 Messrs. Robert E. Schumacher & Robert Domrose, State Fish and Game, Kalispell (proposed stream S&M development work)
Jan. 20 Mr. Robert Duncan, Kicking Horse Job Corps (recreation opportunities for Job Corps enrollees)
Jan. 26 Mr. Ash Brann, GMA, Helena (littering case)
Jan. 27 Messrs. John Van den Akker & Art Huey, Regional Office, Portland (Job Corps Work Projects)
Jan. 27 Dr. Philip Wright and Mr. Bart O'Gara, University of Montana, Missoula (collect antelope for study)
Jan. 28 Mrs. Joyce Lott, Moiese (several visits regarding her weekly column in Ronan Pioneer)
Jan. 31 Mr. Ed Flickinger, FWS, Branch of Research, Hamilton (discussion of pesticide use)
Feb. 14 Miss Mary Meagher, Park Naturalist, Yellowstone Park (Courtesy call)
Feb. 14 Messrs. Don Ryerson, MSU, Bozeman, Ed Bratton & Jack Maki, County Agents, Ronan, Bob Racicat, County Agent, Thompson Falls, Ben Gallegos & Ray Booker, Flathead Agency, Dixon (Cooperative range-interseeding plots on Bison Range)
Feb. 17 Mr. Clem Rose, SCS, Polson (grazing program)
Feb. 23 Rev. A. J. Ferretti S.J., St. Ignatius (discuss historical origin of names on Bison Range)
Feb. 24 Mr. Bart O'Gara & Dr. John Harris, U of M, Missoula (collect antelope)
Feb. 25 Mr. Clark Stanton, Kickinghorse Job Corps (discussion of work projects)
Mar. 1 Mr. Harold Hardesty, Tule Lake Refuge, California (transfer of excess property)
Mar. 2 Mr. John Corbett, Law & Order, Flathead Agency, Dixon (information on First Aid Class)
Mar. 4 Mr. Mel Ruder, Editor Hungry Horse News, Columbia Falls (information on photographic possibilities)
Mar. 8 Dr. John Corcoran, USDA Veterinarian, St. Ignatius (information visiting horses vs. disease introduction)

Mar. 11 Mr. Wayne Chattin, Ass't. Employment Officer, Flathead Agency, Dixon (cooperative summer youth work program)

Mar. 16 Mr. Jack Maki, County Extention Office, Ronan (pick up soil samples)

Mar. 22 Messrs. George Devan and Tom Davies, Ravalli Refuge, Montana (transfer of surplus property)

Mar. 23 Mr. J. K. Lawrence, State Highway Dept. Engineer, Missoula (recreational development)

Mar. 24 Rev. Robert C. Larsson, St. Ignatius (photography)

Mar. 24 Messrs. Don Ryerson, Jack Taylor, John Dolan, Jim Johnson and Stefin Morsteinsson, MSU, Bozeman, and Bob Ross, SCS (range study)

Mar. 25 Mr. Harold Felsman, Soil Conservation Technician, Flathead Agency, Dixon (range interseeding)

Mar. 25 Mr. Lowell Erickson, Agriculture Engineer, Flathead Agency, Dixon (range interseeding)

Mar. 25 Mr. Elmer Hitchcock, Div. of Wildlife Services, Missoula (dispose of 1080 bait)

Mar. 30 Mr. Henry Baetkey, Ass't. Regional Director, Portland (administrative inspection)

Mar. 31 Messrs. Ed Bratton & Jack Maki, County Extension Agents, Ronan (range interseeding)

Apr. 1 Mr. Harold Hardesty, Tule Lake Refuge, California (transfer piling from McNary)

Apr. 5 Mr. Ash Brann, GMA, Helena (courtesy visit)

Apr. 7 Florence-Carlton Grade School, 60 children and six chaperons (headquarters exhibition pastures and picnic)

Apr. 11 Dr. Raymond Keyser, Veterinarian, Ronan (discuss disease problems)

Apr. 12 Messrs. P. T. LaBreche and Al Rennie, Flathead Agency, Dixon (regarding Job Corps)

Apr. 13 Mr. Bud Black, Montana Highway Dept., Ravalli (regarding oiling of exhibition pasture road)

Apr. 14 Messrs. Gibson E. Bassett & Nate Green, Regional Office, Portland (personnel inspection)

Apr. 14 Mr. Glen Hammer, Creston Fish Hatchery, Kalispell (transportation for R.O. personnel)

Apr. 18 Mr. Ben Gates, Employment Service, Polson (summer employment prospects)

Apr. 20 - 22 Messrs. Jack DeViney, US Information Service, Wash., D.C., Pong Leng-EE, Exchange student from Thailand, U of M, Missoula, and Kenneth Van Sickle & Donald Buchsbaum, Commercial Film Contractors, New York (making movie)

Apr. 22 Mr. Elmo See, Regional Office, Portland (Marsh concession audit)

Apr. 28 Mr. Bill Gabriel, USFS, Teton Nat'l. Forest, Wyoming (antelope photography)

May 2 Mr. Ben Strickland, Commercial Photographer, Livingston (photography - several visits)

May 3 Mr. Ed Loman, Treasure State Telephone Co., St. Ignatius (regarding telephone service)

May 4 Mr. & Mrs. Robert Murphy, Author, Westtown, Pa. (material for book on refuges)

May 4 Class of 60 Senior Economics & Sociology students from Polson High School, with three instructors (talk on economical and sociological aspects of refuge)

May 5 Special Education Classes from Ronan and Charlo, 35 students, two instructors and six adults (tour of range and picnic)

May 5 Messrs. Wilson Woodger and Clark Stanton, Director and Deputy Director, Kickinghorse Job Corps (work projects)

May 6 Prof. Paul Alexander, U of M, Missoula, with six geography students (tour and talk)

May 6 Mr. & Mrs. Pierre Salinger, California, and Mr. & Mrs. Elmer Glynn, Missoula (visit during speaking engagement in Missoula)

May 11 Third and Fourth Grades, Ronan, 50 students with instructors (picnic and trip around exhibition pasture)

May 16 Mr. Stan Meyer and group, Wendt Advertising Agency, Great Falls (photos for buffalo film)

May 22 Group of 90 Boy Scout Cubs and parents, Missoula (picnic)

May 23 Dr. John Corcoran, USDA Veterinarian, St. Ignatius (cooperation - several visits)

May 26 Approximately 100 First Grade students, parents and teachers, Ronan (picnic and tour headquarters Exhibition Pastures)

May 27 Approximately 50 Third and Fourth Grade students, with teachers, Lolo, Montana (picnic and tour of headquarters)

May 28 Mr. Tom Davies and family, Ravalli Refuge, Montana (visit)

May 29 Mr. Larry Steen & family, NW Montana correspondent for Spokesman-Review, Kalispell (material and photos for article on tour)

May 31 Approximately 40 Fifth & Sixth Grade students and teacher, Lolo, Montana (picnic, talk and tour of headquarters)

June 1 Mr. Ed Flickinger, FWS, Branch of Research, Hamilton (cooperation)

June 5 Mr. Burton DeGraw and family, Corps of Engineers, Portland (courtesy visit)

June 6 Group of 30 Blackfoot Indian 8th grade students, Browning, (talk and tour)

June 8 Mr. & Mrs. Owen Vivion, Medicine Lake Refuge, Montana (courtesy visit)

June 8 Messrs. Richard D. Mundinger and Donald R. Kistner, Regional Office, Portland (courtesy visit)

June 10 Mormon Church Group, Moses Lake, Wash., 40 teenagers and 10 supervisors (talk and tour)

June 12 Annual Saddle Club Ride (180 participants) sponsored by Mission Range Riders, St. Ignatius, Montana

June 12 Group of 36 Natural Science Jr. High students with instructors, Sioux City, Iowa and Sioux City, Nebraska (talk and tour)

June 12 Mr. Walter E. Colby, Jr., Commercial Photographer, Kalispell (photography)

June 13 Mr. & Mrs. Larry Wiseman, Pullman, Washington (tour)

June 13 Group of 20 Blackfoot Indian 8th grade students, Browning, (talk and tour)

June 14 Messrs. Therrin I. Kaiar, USFS and William Beaudine, TV Director, California, and E. Arnold Hanson and W. E. Steuerwald, USFS, Missoula (arrangements for "Lassie" TV production)

June 13 - 17 Mr. Don Ryerson, MSU, Bozeman, and group of five girls (count and clip study plots)

June 18 - 20 Mr. George L. Wiseman, Branch of Refuges, Regional Office, Portland (inspection)

June 23 Dr. John H. Thomas, Stanford University, California (collecting plant species - several visits throughout the summer)

June 23 Mr. Marcus Bourke & son, Missoula, with foreign exchange students Mike Flutter, Germany, Eric RondR, France and Belaye Stefanas, Ethiopia (tour)

June 27 Mr. & Mrs. Arden Jenkins, Missoula, with foreign exchange students Aliette Marc, France; Ana Maria Oguendo, Ecuador; Edgar Wagner, Germany; and Gustavo Braco, Italy (tour)

June 29 Mr. P. T. LaBreche, Superintendent Flathead Agency, with Mr. & Mrs. Marvin L. Franklin, Phillips Petroleum, Oklahoma and Mr. & Mrs. Wayne Baskin, BIA, Billings (talk and tour)

July 1 Mr. James Koplin, U of M, Missoula (research project arrangements)

July 1 Mr. Del Pierce and family, Malheur Refuge, Oregon (visit)

July 2 Mr. Bob Anderson, Detroit, Michigan, and 16 Boy Scouts (tour)

July 7 Mr. Bob Lambeth, State Fish and Game, Polson (delivered orphan white-tailed deer fawn)

July 7 Mr. Hunter Eu, Forester, Taiwan Forest Service, Island of Formosa (tour of range and discussion of refuge management and administration)

July 7 Mr. Gerald R. Bell, Glacier National Park, Montana (to pick up Mr. Eu)

July 8 Mr. Gordon McMillan, AAA Montana Representative, Helena (information on tours for publicity)

July 11 - 12 Mr. James Koplin and 12 students of Ornithology Class, MSU Biological Station, Bigfork (study of range birds)

July 14 Mr. Dale Morgan, Spokesman-Review, Spokane, Washington (photography)

July 15 Dr. Paul W. Lukens, Jr., U of M, Biological Station, Bigfork (trap mice) w/mammalogy class of 17.

July 17 Fifty students from Sophia University, Tokyo, Japan, attending summer school at Gonzaga in Spokane (tour and talk)

July 18 Group of 50 Head Start students, with teacher Don Hinckly, St. Ignatius (to see Lassie)

July 18 - 19 Messrs. Glenn A. Kovar, USFS Technical Advisor, William Beaudine, Sr., Director, Bill Beaudine, Jr., Production Mgr., Dick Delruth, Ass't. Director, Bob Bray, Walter Coy and Bill Williams, Actors, Rudd Weatherwax, Owner-Trainer of Lassie, and Tom Beemer, Commercial Photographer, Yachats, Oregon (Lassie TV filming)

July 19 -Aug.10 Mr. Larry Linnard and wife, Photographer & Lecturer, Maumee, Ohio (buffalo photography)

July 19 Dr. Richard Tabor, U of M, Missoula, with 12 Turkish Foresters (talk and tour)

July 20 Dr. Richard Vogl and 10 Ecology students, U of M Biological Station, Bigfork (ecology studies)

July 20 Mr. Don Hinckley and 100 Head Start students from Ronan and Polson (talk and short tour)

July 22 Mr. Don Hinckley and 70 Head Start students from St. Ignatius and Arlee (talk and short tour)

July 25 Dr. John H. Thomas and 19 Vascular Flora students, U of M Biological Station, Bigfork (spent day on range)

July 26 Messrs. John Milodragovitch, Regional Forester, and Robert V. Bruce, Administrative Officer, USFS, Missoula (courtesy visit and tour)

July 29 Dr. J. G. Nelson, University of Calgary, Alberta, Canada (effect of bison on vegetation soils and other aspects of landscape - study)

July 29 Mr. Wally Schwank and Family Camping Workshop (approx. 80) sponsored by U of M and Confederated Tribes (tour & picnic)

July 29 Mr. John C. Moe, FBI, Missoula (investigate break in at powder storage bunker)

Aug. 2 Prof. D. D. Millspaugh and 8 students in Biology, Iowa Weslegan College, Mt. Pleasant, Iowa (talk and tour)

Aug. 2 Boy Scout Group #166, 31 scouts and five leaders, under Supervisor D. Merlin Archibald, Billings (talk and tour)

Aug. 2 - 24 Dr. Dale Lott and family, University of California, Davis (buffalo research study)

Aug. 17 Messrs. Cos C. LaBarre and Harry R. Peterson, CAS, Portland (wage survey)

Aug. 22 Mr. N. S. Novankowski, Canadian Wildlife Service, Edmonton, Alberta, Canada (buffalo information)

Aug. 22 Mr. Tom Keast, PHS, Indian Health Division, St. Ignatius (waste disposal facilities)

Aug. 27 Mr. and Mrs. Ray Hotchkiss, Red Rock Lakes Refuge, Montana (courtesy visit)

Aug. 28 Drs. R. D. Tabor, U of M, Missoula and Pyzard Doziecrotowski, Forest Instructor, Warsaw (tour of range)

Sept. 5 Mr. & Mrs. Alton Waller, Medicine Lake NWR, Montana (visit)

Sept. 5 Mr. Francis H. Elmore, Glacier National Park and Mr. Neville C. Gove, Koscuesho State Park, Australia (tour of range)

Sept. 9 Messrs. John O. O'Leary and Pat McKelvey, State Fish and Game Dept., Helena (deliver orphan antelope fawns)

Sept.12 Messrs. Dick Everett and Howard Johnson, State Highway Dept., Missoula (inspect road system)

Sept.14 Drs. Philip Wright, Ludvig Browman and Donald Jenni, U of M, Missoula (on range w/Bromley regarding his study)

Sept.16 Messrs. John Van den Akker, Regional Office, Portland, and Harry B. Crandall, Central Office, Wash., D.C. (Master Plan)

Sept.17 Messrs. Gerry Atwell, Wildlife Research Unit, U of M, and Bertil Haglund, Head, Dept. of nature conservation and spare time use, Sweden (visit and tour)

Sept. 25 Mr. Merle Richmond, FWS Branch of Research, Hamilton (courtesy visit)

Sept. 27 Mr. Joe Van Wormer, Writer-Photographer, Bend, Oregon (sheep photography)

Oct. 3 Rev. Robert C. Larsson and Mr. Albert Rennie, St. Ignatius and Dixon, Montana (buffalo meat drawing)

Oct. 3 Mr. Jerry Ridgeway, Division of Wildlife Services, Missoula (cooperation)

Oct. 5 Mr. Ash Brann, GMA, Helena (enforcement)

Oct. 6 7, &10 Messrs. Jed Devan and Tom Davies, Ravalli Refuge, Montana (roundup)

Oct. 6 - 12 Mr. Jack Richardson, Salton Sea Refuge, California (returned for roundup)

Oct. 5 - 10 Mr. Dan Snyder and crew, KRTV, Great Falls (videotape film buffalo roundup)

Oct.10 Mr. Stan Federman, Staff Writer, The Oregonian, Portland (story on buffalo roundup)

Oct. 10 - 12 Drs. John Corcoran, St. Ignatius and Bob Manlove, Missoula, Livestock Inspectors (buffalo vaccination and inspection)

Oct. 11 Mr. L. P. Morton, Sculptor, Great Falls (photographs for his sculptoring)

Oct. 11 Messrs. Robert H. Stewart and Louis Burkhoffner, State of New Mexico, Dept. of Game and Fish (took delivery of ten live buffalo)

Oct. 11 Drs. Wm. Jellison and Cora R. Owen, PHS, Hamilton Laboratory (vaccinate buffalo calves)

Oct. 16 Missoula Chamber of Commerce sponsored tour with group of 15 men from Civil Aeronautics Board (tour of range)

Oct. 26 Special Education Class of 15, with Instructor Larry Allen, Missoula (talk and tour)

Oct. 28 Mr. Frank Evans and class of 15 Resource Conservation students, Northern Idaho Jr. College, Coeur d'Alene (talk and tour)

Oct. 29 Mr. Olle L. Steinvall, Missoula, with 23 Emmanuel Baptist Church Youth Ass'n. members (talk and tour)

Nov. 4 Mr. Bob Simpson, Morehead City, North Carolina, Outdoor Writer (photography and story)

Nov. 4 Obernkirchen Children's Choir (35 children and 4 adults), Buckeburg, Germany (talk and tour)

Nov. 9 Mr. Curtis L. Burley, BSFW Fishery Biologist, Spokane, Wash. (review of Bureau Knowles Dam study)

Nov. 9 Mr. Tim McGovern, Vancouver, Canada (Preliminary survey for microwave installation for N.P. Railway)

Nov. 14 Messrs. Jerry Ridgeway, Elmer Hitchcock, Roy Guffey and Norton R. Miner, Division of Wildlife Services, Missoula, Helena and Billings (butcher horses)

Nov. 16 Mr. Robert Racicot, Extension Agent Sanders County (weed control)

Nov. 28 Dr. Wm. Jellison, Public Health Laboratory, Hamilton, with Drs. W. A. Nelson and J. A. Shemanchuk, Research Station, Canada Dept. of Agriculture, Lethbridge, Alberta, Canada (specimen collection)

Nov. 30 Mr. David J. Brown, Kootenai Refuge, Bonners Ferry, Idaho (delivered load of grain)

Nov. 30 Messrs. Carl W. Wetterstrom, Frank Blackmer and Gary Stensatter, USFS, Missoula; Mr. Patrick J. Keough, Corps of Engineers, Seattle; Mr. George Saito, Bureau of Outdoor Recreation, Seattle; and Mr. Curtis Burley, River Basins, Spokane (discussion of Knowles Dam proposal)

Nov. 30 Charlo 7th & 8th grades, 64 students and teacher (short talk and tour through slaughterhouse)

Dec. 9 Mr. Jerry Atwell, Wildlife Research Unit, U of M (sheep pictures)

Dec. 9 Mr. Harold Hardesty, Tule Lake Refuge, California (transfer Jeep and "22" tractor)

Dec. 14 Mr. Robert Scheumacher, State Fish and Game, Kalispell (fishing regulations)

Dec. 15 Drs. Stall and Addison L. Irwin, State and Federal Meat Inspectors, Missoula and Billings (inspect slaughterhouse)

Dec. 19 Messrs. Ash Brann, Helena, and Don Combs, Lewistown, Division of Management and Enforcement (courtesy call)

Dec. 29 Mr. Cory Hall, Forester, SCS, Plains, Montana (recreation)

Dec. 29 Mr. & Mrs. Donald Marble, U of M, Missoula (research - Animal Radiation Study)

C. Refuge Participation

Mazzoni

Jan. 12 Attended annual Western Montana Fish and Game Ass'n. meeting in Missoula.

Feb. 5 Attended Kickinghorse Job Corps Center dedication program.

Feb.16,23 Attended evening Community Development Program meetings in Mar.2 & 9 Ronan with May and Nail.

Feb. 21	Attended Federal Businessmen's Ass'n. luncheon-meeting in Missoula.
Mar. 4	Attended Western Montana Fish and Game Ass'n. Executive Committee luncheon-meeting in Missoula.
Mar. 8	Attended Annual Lake County Conservation Day program in Polson.
Mar. 19	Judged at District Science Fair in Hamilton; also, escorted group of high school students from Charlo.
Mar. 21	Attended Federal Businessmen's Ass'n. luncheon-meeting in Missoula.
Mar. 23 - 27	Presented slide-talk at Northwest Section of the Wildlife Society annual meeting in La Grande, Oregon.
Apr. 12	Appeared on KGVO-TV in Missoula, with Lake County Agent Ed Bratton.
Apr. 20 - 22	Assisted with and interviewed for U.S.Information Service film production on Bison Range.
May 5	Attended Western Montana Fish and Game Ass'n. Executive Committee meeting in Missoula.
May 19	Keynote speaker at Charlo High School Junior-Senior banquet, with 200 students, parents and teachers in attendance.
June 2	Slide-talk to 15 members of the Mission Range Riders Saddle Club in St. Ignatius.
June 11	Gave talk to about 200 Mission Range Riders Saddle Club members and guests at their camp at Ravalli the evening before the annual Saddle Club ride.
June 13	Orientation and planning meeting with "Lassie" television production staff.
May or June	Attended annual Polson Outdoor's Sportsmens banquet.
	Attended annual district Wildlife Federation meeting in Polson.
July 12 - 13	Presented slide-talk at Western Ass'n. of Fish and Game Commissioners annual meeting in Butte.
July 18 - 19	Cooperated for "Lassie" TV production on range, for "Lassie and the Buffalo" filming.
Sept.27	Participated on land use panel discussion at Montana State Farm Bureau natural resources conference in Bozeman.
Oct. 7	Assisted with KRTV, Great Falls, videotaping of annual roundup activities. Also, with May, interviewed for this program.
Nov. 17	With Augsburger, participated in Placement Day Program at University of Montana, Missoula.
Various	Attended regular meetings of Lake County Technical Action Panel, and the Charlo Lions Club. Served as program and publicity committee chairman for latter organization.

<u>Nail</u>

Jan. 6	Attended Equal Employment Opportunity meeting in Spokane.
Feb.-Mar.	Attended evening Community Development Program in Ronan.
Apr. 14	Represented refuge at range interseeding public demonstration on Ravalli Hill. Spoke to about 45 ranchers and farmers.
July 12 - 13	Attended Western Ass'n. of Fish and Game Commissioners annual meeting in Butte (at personal expense).
Aug. 16	Attended Wage Board Survey planning session with Hogge.

Augsburger

Oct. 6	Worked with KRTV crew for videotaping of buffalo roundup.
Nov. 17	Participated in Placement Day Program at University of Montana, Missoula, with Mazzoni.
Nov. 21	Attended Federal Businessmen's Ass'n. luncheon-meeting in Missoula.

May

Feb.-Mar.	Attended Community Development Programs in Ronan.
Apr. 21	Worked with U.S. Information Agency film production on range.
July 18 - 19	Supervised cooperative refuge efforts on behalf of the "Lassie" TV production on range.
Sept. 20	Attended Wage Board Survey planning session in Missoula.
Sept. 23 - 27	Participated in Wage Board Survey collection team in Ronan, Polson, Plains and Thompson Falls area.
Oct. 7	Assisted with, and was interviewed for KRTV, Great Falls, videotaping.
Oct.	Conducted NRA Hunter SAFETY Course for eight youngsters in the Moiese Valley.
Various	Conducted tours for several groups and individuals on range.

Kraft

Mar. 11	Slide-talk presentation to 40 students at the Moiese elementary school.
Oct. 18	Slide-talk presentation to 15 members of the St. Ignatius Explorer Scout Troop.
Various	Attended regular meetings of the Moiese Grange #118. Conducted tours for several groups and individuals on the refuge.

Hogge

Aug. 16	Attended Wage Board Survey planning session in Missoula.
Sept. 23	Participated in Wage Data collection in Ronan-Polson area with May.
Various	Served as Scout Master of Troop 56, Charlo (12th year). Member of District and Council Leadership training committee, B.S.A. Member District 28 School Board. Official judge for Charlo Lions Club Peace Essay contest. Conducted tours for several groups and individuals on refuge.

Hotchkiss

Conducted tours for several groups on refuge.

D. Hunting

There is no public hunting on the Bison Range. General hunting conditions in the Lower Flathead Valley have been discussed in the Ninepipe and Pablo Narrative Reports.

E. Fishing

Public fishing was authorized on the Bison Range this year, the first time in its history. Approximately 1.5 miles of the Jocko River within the refuge boundaries were opened. Fishing use was light, and the total number of fishermen utilizing the area was estimated at 200.

This section of the Jocko provided some marvelous trout fishing during the year. Rainbows weighing from one to two-and-a-half pounds were not uncommon.

F. Violations

Four known violations occurred on the range during the year. On January 22, a Missoula resident was observed throwing a beer bottle out of the window of his vehicle just inside the refuge entrance. The man was apprehended and later taken before the U.S. Commissioner in Missoula by Game Management Agent Ash Brann. He was found guilty and fined $25.00.

During the latter part of January, we noticed that a small refuge directional sign, located on County 212 south of the Moiese store, had been removed and, presumably, stolen. Evidence was totally lacking, and the whereabouts of this sign remained a mystery at the end of the year.

On July 26, Irrigation Service personnel discovered that the refuge powder and cap-storage houses on Ravalli Hill had been broken into. One box of refuge electric caps was stolen, and all of the Irrigation Service's caps and half a roll of prima cord was taken. The theft was reported to John Corbett, Law Enforcement Officer, Bureau of Indian Affairs, Dixon, and to the local FBI agent. Their investigation revealed no evidence, and the thieves had not been apprehended at the close of the reporting period.

One of our pet white-tailed deer fawns was found dead with a gunshot wound on November 1. The fawn had apparently been shot in the picnic area, then ran to the headquarters area where it was found. This case also remained unsolved at the end of the year.

G. SAFETY

Scheduled SAFETY meetings were as follows:

Jan. 10 Accidents which had occurred during 1965 were reviewed and discussed. All major 1965 work programs were reviewed, and SAFETY considerations discussed.

Feb. 8 The station SAFETY Program and Fire Plan were read and discussed. The last Quarterly SAFETY Checklist was reviewed, and plans made to overcome deficiencies. SAFETY in relation to the Job Corps work crews was discussed. Suggestion that each monthly SAFETY Committee Chairman post a SAFETY slogan was adopted.

Mar. 7 Recent accident was reviewed by employee injured, and suggestions made for future prevention. Use of various SAFETY protective devices was discussed and recommendations made for specific problem areas.

Apr. 6 The element of SAFETY was discussed in relation to the following subjects; use and care of hand tools; fence construction and maintenance; lawn mowers; and ticks.

May 2 Care in the use and handling of flammable liquids was discussed. Water SAFETY, in relation to swimming and boating, was also discussed, and recommendations made relative to best method of rescuing a drowning person.

June 6 Article from Reader's Digest on defensive driving entitled, "Can you 'Talk' to other Drivers?", was discussed. Precautions for use of creosote were also discussed.

July 11 Forest Service film "Horse Sense" was shown, and recent accident involving a horse reviewed. Article on "SAFETY in the Use of Acetylene and Oxygen" was reviewed and discussed. Precautionary measures during herbicide application were reiterated. Use of recently purchased Venti-breathers for protection from herbicides was emphasized.

Aug. 15 The films, "When the Chips are Down" and "Drivers Education Unit", were shown. SAFETY precautions for repairing and inflating tires were discussed.

Sept. 13 The film, "The Inner Mind of Walter Whitty", was shown. A typical accident was described and analized, and multiple choice test on SAFETY in construction given.

Oct. 3 The subject, "Gun and Hunter SAFETY", including treatment of gunshot wounds, was discussed. The film, "How to Clean a Gun", was shown. SAFETY aspect of forthcoming buffalo roundup and corral work was also discussed.

Nov. 7 The film, "To See Ourselves", was shown. The October SAFETY Sentinel article on "Back to School SAFETY" was reviewed. A report on the recent fire-fighting course held at the Flathead Agency was given to the group by the employee who attended the course.

Dec. 12 Subject, "Accidents Most Prevalent at This Time of Year", based on consultation with local doctor was discussed. Reader's Digest article, "Wanted - New SAFETY on Older Roads", was discussed. SAFETY critique on recent slaughterhouse operation during buffalo disposal followed.

Quarterly fire drills were held on March 2, May 16, August 31 and November 23.

We had three accidents during the year, as follows: (1) injury to employee's back from lifting; (2) chipped ankle bone from fall with a horse; and (3) eye irritation from minute piece of galvanized metal roofing becoming lodged on iris. All three accidents required medical attention, but only the first two involved lost time. Accident-free days totaled 163 at the end of the year.

VII. OTHER ITEMS

A. Items of Interest

1. Training

Heavy Duty Mechanic Grant Hogge successfully completed a 24-hour course on steering alignment and wheel balancing, and an 8-hour course on four and five speed transmissions at the General Motors Training Center, Tigard, Oregon, during the week of August 29.

Mr. Hogge also completed an International Fire SAFETY Course, instructed by the State Fire Marshall, and sponsored by the BIA at the Flathead Agency. Foreman May and Maintenanceman Kraft attended portions of this course, as time permitted. Mr. Hogge presented course material at station SAFETY meetings for the benefit of the remaining staff members.

Foreman May again represented the Bison Range in the consolidated wage survey for this area. However, Mr. Hogge and Assistant Nail were both given an opportunity to participate in certain phases of the wage survey to familiarize them with methods and procedures of wage data collection and wage determination.

Manager Mazzoni and Assistant Nail attended the Refuge Work Shop at the Benton Lake Refuge, Great Falls, during the week of April 25. This was an excellent session, and one we hope is continued on an annual or, at least, bi-annual basis.

Manager Mazzoni, Assistant Nail and Foreman May attended a series of evening lectures sponsored by the Cooperative Extension Service, Montana State University, on Community Development, held in Ronan during February and March. Although not directly related to the refuge program, the material presented was of considerable value in preparing one as a more knowledgeable and, perhaps, effective member of the community.

2. Personnel Transfers, Retirement and Awards

Mrs. Young was awarded a 20-year pin at a staff meeting on February 8. This award represented over 19 years of service to the Bureau at the Bison Range.

On April 7, Meritorious Service awards were presented to retired Refuge Managers C. J. Henry and Ben Hazeltine during a ceremony at refuge headquarters.

A Meritorious Service award was presented to retired Manager Sheldon "Skeet" Dart by Assistant Regional Refuge Supervisor Wiseman at a refuge picnic on June 18. C. J., Ben, Skeet and retired Biologist Watson Beed all reside in the Flathead Valley.

Assistant Manager Mel Nail accepted a promotion and transfer to the Willapa Refuge, Washington, as Project Leader in August. Mel and his family departed on August 29.

Manager (Trainee) John G. Augsburger replaced Mel Nail on September 6. John hails from the University of Arizona, Tucson, and came to us through the Student-Trainee Program following a summer on the Desert National Wildlife Range, and a summer on the Stillwater Refuge.

Maintenanceman Ed Krantz was awarded a $50.00 incentive award on December 28, for a wire-unrolling device, Suggestion 1-67-10.

Maintenanceman Forest L. Largent retired on December 30, following over seven years of service to the Bison Range during a ten-year period. At a retirement party on January 13, 1967, "Frosty" was presented with a Commendable Service Award, a 16" x 20" color enlargement of a buffalo roundup scene (showing, among other things, Frosty on his favorite horse "Cactus"), and a photo album containing a collection of photographic momentoes of his years on the Range. Frosty was a valued employee and a wonderful person. We shall miss him.

3. Miscellaneous

The cooperative summer student work program agreement initiated in 1965 with the Flathead Agency failed to materialize in 1966. Two Indian boys reported for work during the first week in July. One quit after the first day, and the second failed to show up after about one week. Work opportunities for Indian youngsters under the BIA summer employment program are more than ample. Interest and ambition on the part of the youngsters seems to be lacking.

B. Credits

Mazzoni - those sections and items not listed below.

Nail - summary of weed control data for NR-12.

Augsburger - summary of deer herd composition data for Section II, 3 and 4; Section VI, C; prepared NR-3 and 12; and mounted photos.

May - summary of accomplishments and cost data for Section III, and deer and elk disposal cost data for Section IV, B.

Hogge - summary of accomplishments for Section III.

Crevar - typed captions for photo section.

Young - typed and edited entire report.

All personnel contributed to collection of field data essential to the preparation of this report.

C. Photographs

Credit for the various photographs is given in each caption.

Respectfully submitted,

Joseph P. Mazzoni

Joseph P. Mazzoni
Refuge Manager

January 26, 1967

Approved: FEB 24 1967

John D. Findlay
Associate Regional Director

3-1752
Form -2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge National Bison Range Months of January to April, 1966

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	2,000 A. grassland & bottoms	40	-	-	Unknown	-	-	-	50	Some movement from refuge during early spring.
Chukar Partridge	6,000 A. mixed cover	120	-	-	Unknown	-	-	-	50	Population believed unchanged from that reported at close of period 1965.
European Gray Partridge	12,000 A. mixed cover	40	-	-	Unknown	-	-	-	300	Population believed generally unchanged from December 1965.
Dusky Grouse	2,000 A. conifer type	33	-	-	Unknown	-	-	-	60	Population believed unchanged from December 1965.
Ruffed Grouse	300 A. brushy stream bottoms	60	-	-	Unknown	-	-	-	5	No observations during report period, but no indication that few birds noted in 1965 are not still present.

Remarks: (1) Population estimates based on general reconnaissance trips in area only, and are quite rough.

(2) Weather during the 1965-66 winter period extremely mild; all wildlife species wintered quite well. There were no indications of significant winter losses.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form [illegible]-2
(April 1946)

UPLAND G[illegible] BIRDS

1613

Refuge National Bison Range Months of May to August, 1966

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	2,000 A. grass-lands & bottoms		2	10	Unknown	-	-	-	50	Some movement to adjacent farmland
Chukar Partridge	6,000 A. mixed cover		4	35	Unknown	-	-	-	75	First successful nesting season noted in several years
European Gray Partridge	12,000 A. mixed cover		9	110	Unknown	-	-	-	400	Excellent nesting success - 400 based estimate, may be conservative
Richardson's Dusky Grouse	2,000 A. conifer type		4	20	Unknown	-	-	-	70	Very, very rough population estimate
Ruffed Grouse	300 A. brushy stream bottoms		-	-	Unknown	-	-	-	5 (?)	May no longer occur on Bison Range - not observed since 2/27/1965

Remarks: Population estimate based on general reconnaissance of area.

INSTRUCTIONS

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* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(Apri 1946)

UPLAND GAME BIRDS

1613

Refuge National Bison Range Months of September to December, 19 66

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked Pheasant	2,000 A. grasslands and bottoms	40	-	-	Unknown	-	-	-	50	some movement to adjacent farmland.
Chukar partridge	6,000 A. mixed cover	80	-	-	"	-	-	-	75	Excellent early winter survival indicated
Gray partridge	12,000 A. mixed cover	30	-	-	"	-	-	-	400	as above -
Richardson's * grouse	2,000 A. Conifer type	28	-	-	"	-	-	-	70	as above -
Ruffed grouse	300 A. brushy stream bottoms	60	-	-	"	-	-	-	5(?)	May no longer occur as permanent resident - not observed on Range since 2/27/65 - however, 2 seen east of boundary on Post Creek on 12/17/66-

Remarks:

* Previously recorded as dusky grouse -
Population estimates based on general reconnaissance trips on area only -

INSTRUCTIONS

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(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form N 3
(June 1945)

BIG GAME

Refuge National Bison Range Calendar Year 1966

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses				(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Donated to F. Agency Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Accidental Loss	Number	Source	At period of Greatest use	As of Dec. 31	
Bison	15,600 acres grassland	82	1	10*	74			5		1	-		424	317	
Elk	5,000 acres timber & grassland	15			15				1				73	60	
Mule deer	10,000 acres timber, brush and grassland	61			58		1	1	4	1	1	Polson Rancher	266	200	
White-tailed deer	4,000 acres timber, brush and grassland	78			50		1	2	2	1	2	Bob Lambeth & Missoula Rancher	253	200	
Bighorn sheep	8,000 acres timber and grassland	14											62	62	
Antelope	6,000 acres grassland	26				14		4	2		3	1 male Malheur 2 kids Mont. F. & G.	116	114	
Mountain goat	2,000 acres timber	1											5	5	
Texas Longhorn	steers - 40 acre pasture	-											4	4	

Remarks:

* 5 male & 5 female yearlings donated to New Mexico Fish and Game.

Reported by _____

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each</u> <u>species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge National Bison Range Year ending April 30, 1966

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator * Control	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Population
Coyote	15,000 A. all habitat	1,500			None									10
Bobcat	"	1,500			"									10
Striped Skunk	2,500 A. stream bottom	25			1									100
Badger	10,000 A. grassland	500			None									20
Beaver	100 A. stream bottom	10			"									10
Mink	100 A. stream bottom	10			"									10
Muskrat	50 A. wetlands	14			"									30
Marmot	2,000 A. mixed habitat	20			"									100
Porcupine	4,000 A. mixed habitat	160			4									25
Raccoon	100 A. stream bottoms	10			None									10
Col. Ground Squirrel	5,000 A. grassland	25			"									200

* List removals by Predator Animal Hunter

REMARKS: (1) Habitat acreages have been corrected either to conform with the Habitat Inventory completed 10/5/65, or to reflect more realistic estimate of available habitat.
(2) Population estimates are based on general observations.

Reported by _____

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

NR-6

Bureau of Sport Fisheries and Wildlife

PUBLIC RELATIONS

(See Instructions on Reverse Side)

Refuge National Bison Range Calendar Year 1966

1. Visits

a. Hunting None b. Fishing 200 c. Miscellaneous 80,800 d. TOTAL VISITS 81,000

1a. Hunting (on refuge lands) No hunting

TYPE	HUNTERS	ACRES	MANAGED BY
Waterfowl			
Upland Game			
Big Game			
Other			

Number of permanent blinds

Man-days of bow hunting included above

Estimated man-days of hunting on lands adjacent to refuge

1b. Fishing (area open to fishing on refuge lands)

TYPE OF AREA	ACRES	MILES
Ponds or Lakes	-	-
Streams and Shores	-	1.5

1c. Miscellaneous Visits

Recreation 80,200 Official 500

Economic Use 100 Industrial -

2. Refuge Participation (groups)

TYPE OF ORGANIZATION	NO. OF GROUPS	NUMBER IN GROUPS	NO. OF GROUPS	NUMBER IN GROUPS
Sportsmen Clubs	-	-	2	535
Bird and Garden Clubs	-	-	-	-
Schools	23	1,092	2	140
Service Clubs	1	15	-	-
Youth Groups	3	142	2	40
Professional-Scientific	11	23	2	300
Religious Groups	3	77	-	-
State or Federal Govt.	6	16	3	275
Saddle Club Ride	1	180		
Other Self-guiding tour	2,540	10,354	8	490
Cars				

3. Other Activities

TYPE	NUMBER	TYPE	NUMBER
Press Releases	100*	Radio Presentations	None
Newspapers (P.R.'s sent to)	5	Exhibits	1
TV Presentations	3	Est. Exhibit Viewers	500

*Estimated total news articles in various local and regional newspapers dealing with the Bison Range.

3-1756

(Rev. 4/63)

INSTRUCTIONS

Item 1: Total of a, b, and c, equal d.

"Visit" - definition. Any person who is on refuge lands or waters during a day or part thereof for the purpose of: hunting, fishing, bird-watching, recreation, business or economic use, official visit, or similar interest. INCLUDE - those who stop within the refuge while traveling on a public highway because of an interest in the area. EXCLUDE - persons engaged in oil or other industry not directly related to the refuge, persons using refuge as most direct route or principal avenue of traffic, and those boating on navigable rivers or the Intercoastal Canal, unless they stop to observe wildlife on the refuge.

Computing visits. Where actual counts are impractical, "sampling" is used with midweek and weekend samples varied by season or weather. A conversion factor of 3.5 (of passengers per car) is used when accurate figures are not available. Each refuge will develop a conversion factor for boats based on range of usage. Count a camper once for each 24-hour period or fraction thereof.

Item 1a: Acres - of refuge open for each type of hunting.

Managed hunts require check in and out of hunters, issuance of permits, or assignment of blinds.

Other - INCLUDE crow, fox, and similar hunting.

Lands adjacent to refuge. Normally considered within 1 mile or less of boundary, unless established sampling procedures cover a wider area. For big game hunting, the distance may be greater.

Item 1b: Acres of streams open to fishing, if practical; otherwise just miles open. Information on "shores" is primarily for coastal fishing.

Item 1c: Recreation. INCLUDE photography, observing wildlife, picnicking, swimming, boating, camping, visitor center use, tours, etc. TOTAL Recreation, Official, and Economic Use visits under Item 1.

Industrial. INCLUDE persons engaged in industry, i.e., oil industry or factories. EXCLUDE these from Item 1.

Item 2: INCLUDE the "On Refuge" groups in Items 1c and 1. In "Off Refuge" column include only those group meetings in which refuge employees actually participate. EXCLUDE these from Items 1c and 1.

Item 3: Exhibits - INCLUDE displays, fairs, parades, and exhibits OFF the refuge; EXCLUDE those ON.

INTERIOR ... AND, OREGON

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECTI[illegible]S, RECEIPTS, AND PLANTINGS

Refuge National Bison Range Year 1966

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs) Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Plantings (Marsh - Aquatic - Upland) Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Honeysuckle	50 ea.	R	5/5/66	**	2.50	None	Refuge		*	Seedlings	5/6-10	99%	
Dogwood	50 "	"	"	"	2.50	"	Headquarters						
Amer. Plum	50 "	"	"	"	2.50	"	Area						
Siberian Crabapple	50 "	"	"	"	2.50	"							
Nanking Cherry	50 "	"	"	"	2.50	"							
Common Lilac	50 "	"	"	"	2.50	"							
Caragana	50 "	"	"	"	2.00	"							
Colorada Blue Spruce	25 "	"	"	"	1.50	"							
Scotch pine	25 "	"	"	"	1.50	"							

* State Forest Nursery, Missoula, Montana

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic _____
Hedgerows, cover patches**.) to 1 _____
Food strips, food patches _____
Forest plantings _____

Remarks: Quantities shown for each species were the minimum that could be purchased from the nursery.

76148

3-1758
Form NR-6
(Rev. Jan. 1956)

Calendar Year 1966

Fish and Wildlife Service — Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge National Bison Range County Lake State Montana

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
None									
								Fallow Ag. Land	

No. of Permittees: Agricultural Operations None Haying Operations None Grazing Operations 4 - Refuge Personnel

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
Grass - for use as feed	15	40	None	1. Cattle	1	9	18.00	
				2. Other	4	31	62.00	
				1. Total Refuge Acreage Under Cultivation				40*
Hay - Wild				2. Acreage Cultivated as Service Operation				40

* Periodic cultivation for grass hay production and irrigated pasture

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.-DUP. SEC., WASH., D.C. 91767

3-1570
NR-8a

REFUGE GRAIN REPORT

Refuge National Bison Range — Months of Calendar Year 1966 through ____, 195__

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred to Mixed	Sold Seeded (spoiled)	Fed	Total		Seed	Feed	Surplus
Oats	947	400	1347	540		247	787	560			
Wheat	192	0	192			192	192	0			
Barley	79	364	443	129		154	283	160			
Mixed grain (oats & Barley)	0	669	669		250	199	449	220			

(8) Indicate shipping or collection points 400 bushels of oats received from Kootenai Refuge 11/30/66.
250 bushels barley received from Kootenai Refuge 9/16/66.
114 bushels barley received from Hinepipe Refuge February 1966.

(9) Grain is stored at barn and granary

(10) Remarks authorization for sale of moldy grain in Mr. Ekedahl's memorandum of 9/13/66.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., H., D.C. 59323

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

Refuge: National Bison Ra

Proposal Number: NBR-66-1, NBR-66-3*

Reporting Year: 1966

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
6-13-66 - 7-19-66	Canada thistle (Cirsium arvense)	Roadside, ditchbanks, around water tanks, Ravalli hill, Telephone Draw & Ravalli pond areas.	276	2, 4-D Amine	140 gal.	2# a.e./acre	219 acre @ 1 to 30 8 acre @ 1 to 50 52 A. at 1 to 100	Kromer and Bean sprayers
6-27-66 - 7-19-66	Goatweed (Hypericum perforatum)	Head & south fork Pauline drainage	590	2, 4-D Amine	275 gal.	16 acres at 2½# a.e./acre 574 acres at 2#a.e./Acre	194 A. @ 1 to 30 24 A. @ 1 to 50 24 A. @ 1 to 100 342 A. @ 3 to 100 6 A. @ 3-3/4 to 100	22 Cat. & Kromer & Bean sprayers.

10. Summary of results (continue on reverse side, if necessary)

* Chemical Control Proposal NBR-66-2, experimental use of Tordon 22K, was not applied or accomplished as planned. It is now planned for 1967.

Canada Thistle

All areas sprayed indicated excellent initial kill ranging from 75 to 95%. Higher mixing rate of 1 to 100, and through wetting of plants, most effective.

St. Johnswort

Mixing rate of 1 to 100 was felt most desirable during early to intermediate growth stages. Rate of chemical in mix was increased as plants began to mature. Initial kill appeared quite good throughout the area sprayed; however, the lower 1 to 30 mixing rate was least effective. Actual kills of 50 to 95% are anticipated.

See text for additional information. See reverse for cost summary.

INTERIOR--PORTLAND, OREGON

COST SUMMARY

Canada thistle

Materials	$280.70
Labor	695.37
Equipment	188.70
Total	$1,164.77
Cost/acre	$4.17

Goatweed

Materials	$545.95
Labor	745.36
Equipment	361.00
Total	$1,652.31
Cost/acre	$2.80

June, 1966 - "Bighorns at Sunset" - One of our most interesting, and certainly most beautiful big game animals. These five rams remained in the head of Trisky Canyon, in full view of the public tour road, for almost two weeks, providing some of our visitors with a rare and thrilling experience. Mazzoni

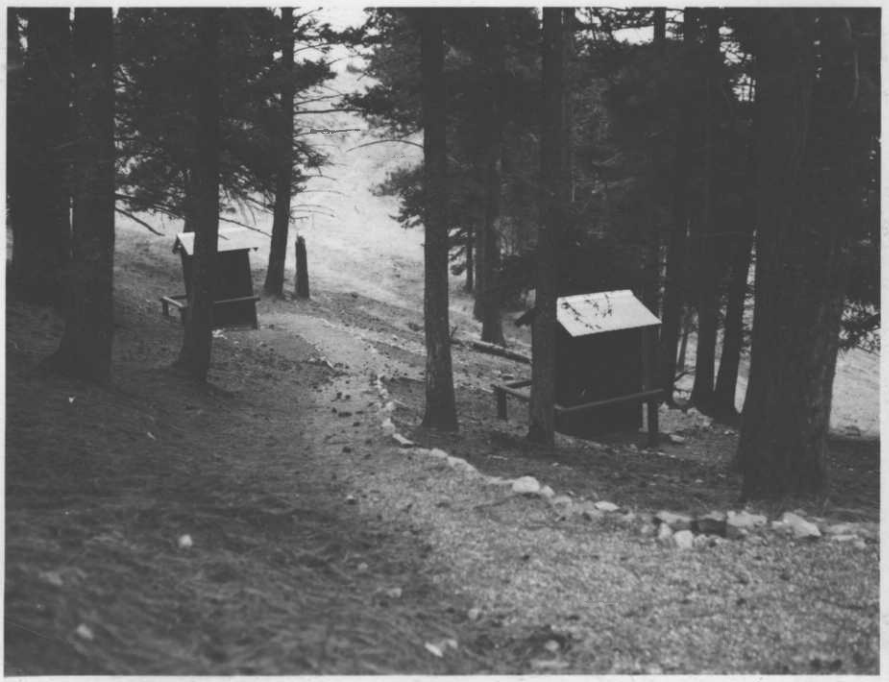
NBR-66-1; 3/66 - Simple, but attractive interpretive display prepared by Assistant Manager Nail for National Wildlife Week. Displayed in Ronan sporting goods store. May

NBR-66-135; 3/66 - Maintenanceman Largent routing one of many signs required for new self-guiding tour program. Use of redwood lumber from BIA surplus water tank substantially reduced total costs. May

NBR-66-3; 3/66 - Locating new cattle guards on exhibition pasture tour road permitted elimination of over one-half mile of fence between road and range proper. Cattle guards were required to replace gates prior to initiation of self-guiding tour program. Mazzoni

NBR-66-171; 11/1/66 - In addition to eliminating a high maintenance cost facility, the esthetic qualities of the entire area were vastly improved. Note: JCCC renovated pasture fence. Mazzoni

NBR-66-172; 11/1/66 - This simple and effective installation was all that was required at the entrance and exit to the 19-mile, self-guiding tour route. Changes planned for 1967 include self registration and honor fee system (self service) at refuge entrance. Mazzoni



NBR-66-174; 11/1/66 - Kickinghorse JCCC crew completed installation of pit-type rest-rooms near Highpoint prior to opening date for self-guiding tour. Landscaping done by refuge personnel. Mazzoni

NBR-66-127; 4/13/66 - Idle refuge lands isolated by Highway 93 were ideally suited to range inter-seeding experimental plots established in cooperation with the State Extension Service. Mazzoni

NBR-66-132; 4/22/66 - U. S. Information Agency sponsored film production featuring Pong Leng-EE, far right, Thailand student at University of Montana - to depict benefits of this Agency's foreign educational program, for showing in Thailand. Buffalo out of sight in upper right, used as backdrop. Mazzoni

NBR-66-7; 5/2/66 - Wire unrolling device designed by Ed Krantz, above, and built by Grant Hogge, eliminated most work and hazards involved with use of 300 pound rolls of woven wire. May

NBR-66-10; 5/2/65 - Previously requiring two and sometimes three men, wire can now be unrolled by one man with any type of motorized equipment, as dictated by terrain. May

NBR-66-105; 5/66 - Nearly four miles of a new antelope-type division fence were completed in time to commence deferred-rotation grazing program following roundup. Has worked well with buffalo without restricting movements of other big game species, and is much less costly to construct. Mazzoni

6/12/66 - Annual Saddle Club ride. Group of about 180 riders approaching the Highpoint lookout for catered lunch. Retired Refuge Manager C. J. Henry in a typical position at left (squinting through a camera, that is). Photo by retired Manager Ben Hazeltine.

NBR-66-93; 5/10/66 - Arrowleaf balsamroot chemical control experiment. WD-6 weed density control plot, two years following spraying. No significant change - remains typical of control area prior to spraying. Nail

NBR-66-95; 5/10/66 - WD-1, one of five weed density study plots. Slight increase recorded in density of balsamroot from initial reduction of 86% to 80% in 1966. This area grazed prior to 1966 measurements. Benefits remain graphically evident. Nail

NBR-66-99; 6/1/66 - All division fence gates on tour road had to be replaced with cattle guards prior to opening date of self-guiding tour program. A total of seven guards was installed. May

NBR-66-173; 11/1/66 - Installation completed. Ninety-nine percent of the buffalo respect the 8' x 12' guards. Those few that don't (generally bulls) jump them with ease. Temporary surplus tent canvas barriers used at critical points during non-tour season. Mazzoni

NBR-66-120; 6/10/66 - A fascinating and rare observation was the birth of twin fawns to our tame antelope, "Tanna". Three to five minutes after the birth of the first fawn, the second is beginning to appear. Nail

NBR-66-114; 6/10/66 - Twenty minutes later, first fawn still too weak to rise; "Tanna" resting between alternate periods of rest and active labor; second fawn showing signs of life. Note white protective material on bottom of hooves. Nail

NBR-66-108; 6/10/66 - Four to five minutes have passed. First fawn instinctively searching for udder; second fawn now bleating and flailing the air with front legs; "Tanna" laboring hard. Nail

NBR-66-16; 6/10/66 - A total of 51 minutes and the twin birth is completed. First fawn still unsuccessfully searching for "that promised land"; second fawn too weak to rise; exhausted mother obviously very content with her first reproductive experience. Nail

NBR-66-12; 6/66 - 10,354 people registered for the self-guiding tour, as compared to the previous guided-tour record of 2,500 in 1965. This family enjoys the view from Red Sleep Mt. viewpoint. May

NBR-66-50; 7/18/66 - "Lassie" TV production filming near headquarters. Story based on Arizona State buffalo management, but all filming done here. "Klunk," our tame buffalo cow, was the principal star. Mazzoni

NBR-66-63; 8/25/66 - Major repairs to the slaughterhouse were completed this year. Wall foundations were replaced. (Note rotted wood foundations, left, center) and cracked and crumbling concrete floors (hand mixed with high dirt content gravel) were replaced with ready mix. Mazzoni

NBR-66-175; 11/1/66 - Repair work was completed in ample time for fall disposal of surplus animals. At this point, deer and elk disposal had been completed, and buffalo butchering was in progress. Mazzoni

NBR-66-176; 11/1/66 - Concrete salvaged from the slaughterhouse floors was used to construct jetties along an eroded section of Mission Creek below headquarters. Note how the jetties have diverted the current towards center of stream. Mazzoni

NBR-66-70; 8/66 - Temporary laborer Priddy on left and YOC student aid Billy Foust lending a hand with some badly needed maintenance. On-the-job SAFETY was the immediate topic after this picture was taken. Mazzoni

NBR-66-64; 8/26/66 - Job Corps crews also completed renovation of headquarters bison exhibition pasture fencing begun in 1965. Materials required for this 1.75 mile job were valued at $3,000.00 - a substantial contribution to the refuge program. Mazzoni

NBR-66-76; 9/9/66 - Maintenanceman Kraft and Manager Trainee Augsburger treating buffalo calf seriously gored, presumably during the rut. Slow, but definite recovery continuing at end of year. May

NBR-66-73; 9/7/66 - Main chute of buffalo corrals had to be completely rebuilt. Native juniper purchased and cut on Catholic Mission lands east of refuge to replace short-lived lodgepole, in place less than 10 to 15 years. Mazzoni

NBR-66-91; 9/30/66 - Nearing completion. Wider catwalks provided at left for viewing public. Woven wire later added for SAFETY. New metal squeeze and chute runs right from center of photo. May

NBR-66-84; 9/19/66 - The "Bone Pile" in "Gut Coulee," historic dumping place for offal and other assorted items since time immemorial. May

NBR-66-177; 11/1/66 - Following burial and development of sanitary land fill. All offal now buried immediately following each butchering session. Area will be seeded in spring of 1967. Mazzoni

NBR-66-78; 9/22/66 - Second-coat of penetrating oil and rock chips completed base preparation of exhibition pasture tour road, one of our most heavily used public-use roads. Work by State Highway Department. Mazzoni

NBR-66-178; 12/5/66 - 4,858 pound shipment of buffalo meat being loaded out at Moiese. Destination - organizations and housewives throughout the West. Total disposal, 108 deer, 15 elk, and 42 buffalo (plus 40 buffalo sold and donated alive). Mazzoni

NBR-66-179; 12/12/66 - Refuge staff at end of year. Front row from left: Joe Mazzoni, Donna Crevar, Jack Lampshire, Gladys Young, "Babe" May, "Frosty" Largent, Back row from left: Grant Hogge, Ed Krantz, John Augsburger, Ernie Kraft, and Frank Kenney. Right, foreground: "Bambi" (what else) and "Snoopy," our official hosts at refuge headquarters. Photo by Mrs. Mazzoni.